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The paucity of meaningful academic experiences for potentially or highly creative individuals prompted researchers and performing artists to meet and discuss the implications for creative opportunities in higher education. A truly creative person is thought to be independent, innovative, flexible, with a highly developed sense of the theoretical and the esthetic, and exercises discipline only when he considers it necessary. A rigidly structured and organized academic system invariably discourages self-expression. Consequently, a number of students transfer from or drop out of educational systems too formalized for their tastes. Unfortunately, academe generally assumes that educational needs of all unusual students are met in programs designed for the gifted or exceptional, and many creative individuals who do not meet necessary academic requirements are excluded or ignored. Many questions were raised to which answers could not be provided but participants agreed that very little research has been done on creativity at the college level, except in the creative arts. The task ahead involves learning about the nature and forms of creativity, establishing whether it is innate or may be developed. Then programs should focus on quality education for the total human being, and be flexible enough to stimulate and encourage creative expression. A bibliography of related publications is included. (WM)

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EDUCATION FOR CREATIVITY

A Modern Myth

PAUL [illegible]

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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The Center for Research and Development in Higher Education is engaged in research designed to assist individuals and organizations responsible for American higher education to improve the quality, efficiency, and availability of education beyond the high school. In the pursuit of these objectives, the Center conducts studies which: 1) use the theories and methodologies of the behavioral sciences; 2) seek to discover and to disseminate new perspectives on educational issues and new solutions to educational problems; 3) seek to add substantially to the descriptive and analytical literature on colleges and universities; 4) contribute to the systematic knowledge of several of the behavioral sciences, notably psychology, sociology, economics, and political science; and 5) provide models of research and development activities for colleges and universities planning and pursuing their own programs in institutional research.

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Report Series

EDUCATION FOR CREATIVITY

A Modern Myth?

Proceedings of a Conference

EDUCATION FOR CREATIVITY IN THE AMERICAN COLLEGE

edited by Paul Heist

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and the Center for Research and Development
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in Higher Education

Preface

A concern for students of superior ability and superior talent has been in vogue in American education for many years. In fact, attention to the concept of individual differences has been basic to several currents of program development and curricular reconsiderations running through the field of education. This focus has led to special programs for the mentally deficient, the retarded, and the slow learner, near one extreme of the aptitude continuum, and for the high-ability student and the talented at the other extreme. However, the concern for individual differences has not been as intensive nor nearly as effective in practice at the level of higher education as at the elementary and secondary levels. This situation has changed somewhat in the post-Sputnik years, and today quite a number of special programs or curricular innovations represent attempts to accommodate the student of exceptional academic ability and talent in college.

The education of young people identified as creative, whether or not they possess academic ability and talent, has probably received the least attention at the college level. The general assumption in most of higher education seems to have been that the students who possess unusual ability, talent, or exceptional creative potential learn and perceive their environment no differently from most other young people. Consequently, it appears that there has been no recognized need for special provisions or individualized treatment.

The education of college youth who have potential for creative expression, when given consideration, has been subsumed for the most part under the concern and programs for high-ability and academically talented students, judging from the content and emphasis of much of the literature on exceptional youth in the past 10 years. Such programs have been in the form of honors programs, gifted student seminars, and independent study courses, open to students who qualified on the basis of grades. The high attrition rate for students of high creative potential generally testifies to the error of assuming their educational needs are being met in programs that lump those of high academic ability and the talented under such gross, comprehensive classifications as the "exceptional" or the "gifted." High ability is very often a characteristic of the highly creative, but many creative people do not exhibit unusual academic ability. Admittedly, some students motivated toward original and creative expression can learn and often do achieve in routine college settings, but we now realize that general teaching methods and curricula are sadly inadequate as presently designed and fail to bring these students to a state approaching optimal self-realization.

This became very apparent during the course of a major research project conducted at the Center for the Study of Higher Education. In this study of students in eight institutions, the research staff found that persons of unusual or exceptional potentialities, as well as many less capable men and women, were leaving college after encountering unsatisfactory, unchallenging, or discouraging academic experiences. In addressing himself to the topic of educating the gifted and creative, Dr. T. R. McConnell, former chairman of the Center, offered the following comments on this problem.

> "At times I am not very sanguine about the desire or the ability of our educational institutions to nurture the talents of their most gifted and creative students. Too often, the college attempts to force its exceptional students to conform, not only to accepted customs and attitudes of the community, but also to conventional habits of mind. Most

> of us are uncomfortable with rebellious intellect and fearful of its consequences, rather than hopeful of the results of its revolt. Therefore, I suspect that all along the way we freeze out the unconventional and creative minds, retaining the dutiful, unimaginative, compliant, competent, and unresourceful grade-getters who will become, in turn, the scholars who will sanction the same behavior in future students. Now and then, fortunately for art, letters, and science, a few mavericks slip through the screen, or quietly internalize their conflict with the stereotyped academic environment while outwardly conforming well enough with the mores to meet the faculty's requirements in greater or lesser degree. But I wonder most about the creative minds who find this environment utterly uncongenial and leave it forthwith. Some of them, perhaps, will realize their potentialities outside the Academy, as artists and writers always have. But others will have been lost to science and scholarship, others who could have brought new light and given new directions to man's long and often weary quest for self-realization."

The phenomenon of failure in educational ranks, briefly described, has much more evidence to substantiate it than to contradict it, as the papers in this volume reveal. These papers were presented at a conference in the spring of 1966, sponsored by the Center for Research and Development in Higher Education and Education Extension, University of California, Berkeley.

This conference directed to education for creativity grew out of concern and speculations about this particular educational problem--a concern shared with research colleagues over several years. There seemed to be general agreement that colleges tend to fail as often as they succeed in educating those between the ages of 16 and 22, who are recognized as creative. From information available, we realized this phenomenon is not limited to average institutions but exists also in elite, selective colleges with the best educated faculty and in institutions with good honors programs or specially developed tutorial curricula. However, since administrators and faculty in most institutions seem to be unaware of the inadequacies and failures in the education of many talented and creative youth, we wondered how best to convey such an important message to the parties in a position to act on it, when experts and writers already had written reams, with relatively little effect on faculty or programs.

We decided to seek speakers who might offer different and possibly new perspectives from several different research settings, with some representation from those conducting basic research on the creative process or creative people. Other researchers were sought from the immediate context of higher education. To complement the contributions from research, representatives from the world of the performing arts were seen as essential to a discussion of creativity. The result of these considerations is to be found in the chapters that follow. It remains for the reader to determine whether or not the different perspectives illuminate problems and objectives in educating for creativity.

- P.H.

Acknowledgments

Sincere appreciation and thanks are due a number of persons who gave valuable assistance from the time of initial planning through the preparation of the proceedings. The conference was cosponsored by the Center for Research and Development in Higher Education and the Education Extension of the University of California. Dr. Jane C. Zahn, then director of the Extension program, and Mr. Thomas Baird, a senior staff member, were involved in the early decisions and encouraged the venture from the beginning. Mr. John Pearson, also on the Extension staff, served as conference manager and should receive much of the credit for expediting the "production" of the three-day conference.

The following people served as chairmen of specific sessions and contributed significantly as discussion leaders to the success of the conference: Dr. T. R. McConnell, professor of higher education at the University of California and former Chairman of the Center for the Study of Higher Education at Berkeley; Dr. Harold Webster, professor of psychology, Brooklyn College, and former senior staff member at the Center for the Study of Higher Education; and Dr. Zahn and Mr. Pearson.

Dr. James Trent, a senior staff member at the Center for the Study of Higher Education, served as panel moderator for the final symposium. He was joined by Dr. Webster and three of the speakers in a summary review of major problems and recommendations.

Miss Janet Tallman helped with early readings for the bibliography and assisted with the editing of the selected references.

Preparation of these proceedings has been chiefly in the hands of the development and dissemination program staff at the Center. Dr. K. Patricia Cross, program coordinator, and Mr. Wilson Schooley, publications manager, have supervised the preparation and made the arrangements for publication. Mrs. Julie Pesonen, editor and member of this same staff, has been very helpful and most patient in assisting with all editorial responsibilities. Special thanks are extended to her.

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DONALD W. MACKINNON

Educating for Creativity: A Modern Myth?

The topic to which I was asked to address myself was originally cast as a simple declarative statement: "Educating for Creativity: A Modern Myth." It was I who added the question mark, recasting it in the form of an inquiry. I doubt very much whether we are doing all that we can by way of fostering the creative potential of our students. However, I also question whether we have any firm evidence that other forms of education being proposed in such great numbers today would succeed any better than our present practices, simply because they have not been tried and tested in any systematic study of their effectiveness.

The field of education is strikingly like that of psychotherapy, not only in that both take as their goal the improvement of the objects of their efforts--students in one case, patients in the other--but that in the past both have not been especially concerned to test the effectiveness of their theories or their practices. The reasons for such strange neglect have been mainly the same in both fields.

Educators and therapists are alike in their concern for others. All too often, they feel that this concern makes whatever they do or propose to do for their charges right. Their missionary zeal for their theories and their practices makes them impervious to the demands for proof of their efficacy. One or two striking positive observations far outweigh in their thinking a host of negative instances, many of which are probably not even observed by them. Thus the need for rigorous checking of their claims is often not even recognized. When, several years ago, a colleague of mine sent to Freud reprints of papers which reported controlled laboratory investigations of the Freudian concept of repression, Freud responded: "I have examined your experimental studies for the verification of the psychoanalytic assertions with interest. I cannot put much value on these confirmations because the wealth of reliable observations on which these assertions rest make them independent of experimental verification." (MacKinnon & Dukes, 1962, p. 703). The attitude of educational reformers toward the innovations which they have proposed or instituted has, in general, not been much different.

The second reason why both educators and psychotherapists have traditionally been disinclined to test the adequacy of their theories and their practices has been the enormous difficulties that any valid test would impose upon the investigator. Such studies obviously must deal with a great complex of variables over extended periods of time. It is a brave, or foolhardy, researcher who undertakes such difficult studies when other simpler experiments are at hand of shorter duration with the possibility of neater research design and certain to yield unequivocal findings. And so, over the years we have repeatedly witnessed new theories and practices, both of education and of psychotherapy, proposed with exorbitant claims made for their effectiveness, which subsequently seem never to be quite fulfilled although never submitted to adequate systematic check. And in the course of time they are shoved aside for the new theories and practices which come upon the scene only to experience, sooner or later, the same fate.

EDUCATION FOR CREATIVITY AT THE COLLEGE LEVEL

One reason for questioning whether colleges are educating for creativity is that colleges, until the last few years, have not concerned themselves with creativity. In this they were merely reflecting the values and interests of society at large. Even within psychology, creativity was a long neglected topic. The present concern with creativity--which at times appears to have become a fad--was stimulated by J. P. Guilford's presidential address to the American Psychological Association in 1950 entitled "Creativity." But it was not until the late 1950's and the early 1960's that the implications for education of the findings of research on creativity began to appear in print, and almost without exception the conclusions seemed to be that those with creative potential were forgotten if not discriminated against at all levels of American education.

All of the studies from which such conclusions so critical of the American educational system were drawn leave something to be desired. Both Torrance's (1959) study of elementary school children and Getzel's and Jackson's (1962) investigation of students in the sixth year through high school took as a measure of their subjects' creativeness their performance on so-called tests of creativity, a highly questionable procedure since the relation of test performance to demonstrated creative behavior was not known. My own studies and those of my colleagues in the Institute of Personality Assessment and Research with mature, practicing members of several professions--research scientists in industry, mathematicians, architects, and writers--had the advantage of a much more acceptable criterion of creativity. We used the judgment of their peers, who evaluated the demonstrated creativeness with which our subjects practiced their professions.

Our studies, however, suffered from the fact that whatever conclusions we drew about the earlier educational experiences of our subjects were drawn from their retrospective descriptions of their experiences at home, in school, and in college, and of the forces, persons, and situations which, as they saw it, nurtured their creativeness. We must remind ourselves that these self-reports are subject to the misperceptions and self-deceptions of all self-reports. Even assuming that the testimony of these creative persons is essentially accurate, this is no assurance that the conditions in the home, school, and society, the qualities of interpersonal relations between instructor and student, and the aspects of the teaching-learning process which would appear to have contributed to creative development a generation ago would facilitate rather than inhibit creativity if these same factors were created in today's quite different world and far different educational climate. It just may be that if there is any myth about the role of colleges and universities in nurturing creative potential, the modern myth may be that we are not educating for creativity. If that should turn out to be the case, I should have to take my share of responsibility for having fostered it.

THE PROBLEMS OF SELECTING FOR CREATIVE POTENTIAL

If colleges are, indeed, to educate effectively for creativity, two basic conditions must be met: (1) They must admit as students those who have creative potential, and (2) they must provide such students with experiences which will serve to develop whatever creative potential they possess.

What are the facts, first with regard to admissions, and second, with regard to the educational experiences offered undergraduate and graduate students?

Are colleges and universities indeed refusing admission to large numbers of students who are especially creative or likely to become creative if they are privileged to have a college education? The truth is that we do not know nor do we have reliable data from which firm conclusions can be drawn. We do have the continuing concern that admissions practices may be working an injustice in individual cases and a mounting fear that the number of cases in which injustice is done may well be on the increase. If we do not have the facts about the number of students with creative potential who are not admitted to college, we, nevertheless, have an increasing body of research data that suggests that highly creative youths are not always those whose academic records are such as to insure their admission to college. It is, then, not surprising that college admissions officers are questioning their policies as never before.

It is fair to say that the general practice has been to select and admit students on the basis of their academic record, performance on aptitude and achievement tests, good citizenship, and leadership potential, with certain notable exceptions, of course. In some large state university and college systems, the only criterion for admission has been graduation from high school or graduation with some minimum grade point average or a specified level of performance on a scholastic aptitude test. Private institutions, especially the smaller ones, have paid more attention to individual cases, with the possibility of greater flexibility in applying the rules. Sons and daughters of important alumni and outstanding high school athletes who do not meet the usual standards have been welcomed in the past by many colleges and, in many instances, recruited.

If exceptions are to be made in admissions practices, however, some would ask: Wouldn't it be better to make them for students who, although their academic records and measured aptitudes and achievements leave something to be desired, have already manifested creative behavior or shown signs of creative potential? But, the skeptic might ask: How can one justify the admission of a student who has shown some creative promise if he cannot or will not measure up to the academic requirements of the college which admits him, at the expense of some other student whose record leaves nothing to be desired in terms of academic achievement? Or he might ask: What, if any, are the reliable signs of creative potential in a student applying for admission to college? What guarantee is there that such creative potential, provided it can be identified, will ever be realized? And finally the skeptic might well be led to question whether colleges, considering their present shockingly high rates of attrition, can afford to admit students who, regardless of their creative potential or demonstrated creativity, have shown neither an interest in nor motivation for conventional academic achievement?

These are questions of policy which every college and university must answer for itself. The basic question is, of course, for what purpose does the college wish to select a student? In line with this conference, I shall assume the answer to be that many students are selected to encourage creativity and to develop creative potential.

PREDICTORS OF CREATIVITY

There is substantial evidence garnered from many studies that the best predictors of academic achievement in college are high school grades and scores on tests of scholastic aptitude. If, on the other hand, one wishes to predict creative achievement in college in both artistic and scientific fields of endeavor, the best predictor is creative achievement--either artistic or scientific--during the high school years or even earlier. Our own studies of highly creative persons in a variety of fields have yielded congruent findings: As students they were, in general, not distinguished for the grades which they received, and in none of the samples did the high school grade point average of the subjects show any significant correlation with their subsequently achieved and recognized creativeness. Further, the productive achievement of our highly creative subjects was not something first manifested in college or after college; rather earlier accomplishments prepared for and in a sense predicted it.

If high school grades and scholastic aptitude scores are not good predictors of nonacademic creative accomplishment during the undergraduate years, are they any better as predictors of creative achievement after college? By now there is plenty of evidence that college grades are generally poor predictors of achievement or success in later life (Price, Taylor, & Richards, 1964; Taylor, Smith, and Ghiselin, 1963; Richards, Taylor, and Price, 1962) or are at best only inefficient predictors (Taylor, 1963). In our own investigations, college grades, in general, have not been predictive of later manifest creativeness. Indeed, in a group of research scientists, college grade point average correlated low and negatively (-.19) with their later rated creativity as scientists. Only in the case of architects did college grades predict significantly (+.27) their subsequently rated creativeness, probably because so much of their graded work in college--the solution of design problems and the like--is exactly what they do as architects. But, even in this sample, the most creative architects were not generally A students. They averaged about B. They were not poor students or lazy. Rather, they were extraordinarily independent as students, turning in an A performance in work and courses that caught their interest, but doing little or no work at all in courses which failed to stir their imagination. This suggests that if we really wish to select for creative potential we should pay more attention to patterns of low and high grades or grade records that improve as the student advances in his major field, as well as nonacademic creative achievements during the undergraduate years. Also, we should give somewhat less credence to mere grade point average when selecting students for advanced graduate work.

However, with even more students applying for admission to graduate schools, increasing emphasis is being placed on undergraduate grade point average and scholastic aptitude in selecting students. This is true despite the considerable evidence that undergraduate grades are generally poor predictors of success in life and the lack of evidence as to just what, if anything, the scholastic aptitude test scores predict. The most widely used tests of scholastic aptitude for graduate work are those of the Graduate Record Examination. But a reviewer of these tests in the Sixth Mental Measurements Yearbook of 1965 writes: "The paucity of validity information is especially unfortunate. In the present atmosphere, critics of testing are bound to ask whether an aptitude test is appropriate or necessary for applicants who have recorded 16 years or so of school achievement and taken a number of similar tests in the process. Other more sympathetic critics may well wonder at the lack of continuing exploration and appraisal of a variety of factors in graduate performance, some of which they might suspect are more accessible and more important than scholastic aptitude for differentiating applicants." (French, 1965, rev. 461)

Reviewing findings similar to those I have presented, John Holland concludes:

> "...[such data] imply a need to examine grading practices, since a college education should be largely a preparation for life, both in the community and in a vocation. Under current grading practices a college education is mainly preparation for more education in graduate school.
>
> "...If a sponsor is interested only in finding students who will do well in the classroom in college, then high school grades and tests of academic potential are the best techniques available. On the other hand, if the sponsor wishes to find college students who will do outstanding things outside the classroom and in later life, then he should continue to make an effort to secure a better record of the student's competencies and achievement in high school.
>
> "...national surveys concerned with the conservation of talent, since they use tests of academic potential almost exclusively, probably present a grossly inaccurate picture of the loss of talent for 'real life'--that is, non-classroom--accomplishment." (Holland, 1965, pp. 22-23)

In seeking to correct the imbalance in past and still current admissions practices, it is important that we not simply substitute a new imbalance for the old. Holland cautions, "...we should not make the same mistake that purveyors of aptitude and intelligence have made in the past; that is, to rely on only one kind of measure and to exclude others." (Holland, 1965, p. 21) We should not assume that nonintellective factors solely determine creative performance.

In earlier institute studies of the relation of intelligence to creativity, we found essentially no relationship between these variables. Taking scores on the Terman Concept Mastery Test as measures of intelligence, the correlation of intelligence with creativity in a sample of architects was -.08 and -.07 in a sample of research scientists. In view of this, I suggested that we may have overestimated in our educational system the role of intelligence in creative achievement. (MacKinnon, 1962 b, p. 493) However, I pointed out that no feeble-minded subjects had shown up in any of our creative groups.

Over the whole range of intelligence and creativity there is undoubtedly a positive relationship between the two variables. But, of course, no college population represents the whole range of intelligence, and, within that limited range, how crucial are differences in intelligence for differences in creativity? My conclusion was that, above a certain minimum level required for mastery of a field, being more intelligent does not guarantee a corresponding increase in creativeness. It simply is not true that the more intelligent person is necessarily the more creative one. We would be foolish to select students for admission to college who have the lowest scores on intelligence tests, but, on the other hand, we clearly are deluding ourselves when we favor one student over another solely on the grounds that he scores some 10 to 20 points higher on some measure of intelligence.

Whereas, in 1962 I was cautioning against "setting the cutting point for selection on the intellective dimension too high," today I would caution against setting it too low, for in some quarters there has been a misunderstanding of my earlier writing. The range of Terman Concept Mastery Test scores for creative architects was, to be sure, a low of 39 to a high of 179, and in another place I reported that in a study of independent inventors the inventor who held more patents than anyone else in the group and, indeed, held more patents than any of our creative research scientists working in industry, earned a score of 6! (MacKinnon, 1962 a) Although I hastened to point out that these were arbitrary or raw scores on the test and not

IQs, that fact, I am afraid, sometimes has been ignored.

One difficulty with Terman Concept Mastery scores has been the impossibility of converting them to IQs. To fill this gap in our knowledge we have returned subsequently to our architects, mathematicians, and research scientists and administered to as many as were willing the Wechsler Adult Intelligence Scale (WAIS), the most thoroughly standardized test of adult intelligence which yields three measures of the IQ: a verbal IQ, a performance IQ, and an overall or full-scale IQ. This study is still in progress, but the results to date confirm the earlier finding in our samples of no relationship between intelligence and manifest creativity. I shall report here only on the full-scale IQ measures.

The samples of architects and research scientists were divided into three subsamples, ranging from most creative to least creative. Each sample of mathematicians, one male and one female, was divided into two groups, a creative group and a control group. The most striking finding is the lack of any significant difference in IQ among the subsamples characterized by different levels of creativeness. The mean IQs for the three groups of architects are 132, 131, and 130; for the research scientists, 132, 132, and 132; for the male mathematicians, 135 and 133; and for the female mathematicians, 129 and 133. The ranges of IQs are similarly comparable from subsample to subsample: for architects, 120-145, 117-142, and 119-143; for research scientists, 120-141, 121-142, and 114-142; for male mathematicians, 118-152 and 126-138; and for female mathematicians, 118-140 and 118-145.

The findings are clear: careers in demanding fields, such as architecture, mathematics, and scientific research, would seem to require an IQ level approaching 120. Although the range of IQ for 140 persons in these professions is from 114 to 152, only one has an IQ above 145 and only two have IQs below 118. In other words, 98 per cent have IQs in the range of 118 to 140.

The range of IQs and the mean level of IQ are not significantly different for subgroups whose levels of creative performance vary markedly. Further evidence that, above a certain minimum level, having a higher IQ does not guarantee a corresponding increase in creativeness is found again in the sample of architects. In this group, WAIS IQs correlate with creativity +.19 (not quite significant at the 10 per cent level of confidence).

While many vocations may require less intelligence than architecture, mathematics, and scientific research, I believe our findings should make us think twice before concluding that by markedly lowering the level of intelligence required for college admission we shall be admitting large numbers of students with outstanding creative potential. We can, I believe, maximize the probability of admitting students with creative potential to college and to graduate training, but not if we merely replace intellective requirements by nonintellective demands. We must supplement tests of intellective functioning and aptitude with independent measures of extracurricular achievement and originality.

However, I am not proposing that we administer to our applicants a battery of so-called tests of creativity. In recent years, Guilford (1959) has worked on the structure of intellect and identification, by factor analysis, of several dimensions of creative thinking. The work on the latter dimensions, including adaptive flexibility, originality, and sensitivity to problems, has led to a widespread hope and expectation that his tests of creative ability would provide us with reliable means for identifying creative persons. So far, however, this hope has not been realized.

In an intensive study of research scientists in the U.S. Air Force (Taylor, Smith, Ghiselin, and Ellison, 1961), Guilford's tests of creativity failed to predict the criterion. In our own studies, these same tests likewise have shown essentially a zero correlation with the criterion. In view of such negative findings, the use of Guilford's battery of tests of creativity potential would be questionable, to say the least.

It is not that tests of this sort fail to tap the kind of psychological processes involved in creative thought, requiring, as they do, that the subject think of unusual uses for common objects or the consequences of unusual events. It is rather that they fail to reveal the extent to which a person faced with a real life problem is likely to come up with solutions that are novel and adaptive and which he will be motivated to apply in all of their ramifications. Much more promising as self-report predictors of future creative performance are autobiographical questions concerning past and present manifest activities, competencies, and achievements, as are found, for example, in the American College Testing Program.

ESSENTIAL EXPERIENCES FOR CREATIVE DEVELOPMENT

The second condition colleges must meet if they are indeed to educate for creativity is that they must provide their students experiences that develop whatever creative potential they possess. The difficulties in discussing this topic are several. Although our findings concerning the characteristics of highly creative persons seem to be reasonably well established now, their implications for the nurturing of creative talent are far from clear. Even if we think we know what kinds of experiences a college should provide, there is no guarantee that providing such experiences will have the same consequences and effects for all students. The wide range of individual differences surely must mean that there is no single method for the nurturing of creativity; ideally the experiences which we provide would be tailormade, if not for individual students, at least for different types of students. We should remember that the same fire that melts the butter hardens the egg.

Just as grades and the academic record have been emphasized in determining admission to college, all too often a continuing stress in college on academic achievement is the prerequisite for admission to special programs, honors seminars, independent study, and research projects. At least an overall B average is the usual requirement for such educational experiences. There is reason to believe, however, that independent students frequently are denied those very educational experiences from which they would profit most because as independent students they are not always among the grade getters. College programs for the talented in the past have been invariably programs for the academically talented.

Our research has shown that creative persons are independent and that this independence, already manifest in high school, tends to increase in college and thereafter. Since it is a fundamental characteristic of creative persons that they are not strongly motivated to achieve in situations which demand conforming behavior, they would seem to be the ideal candidates for independent study and research. I have never been successful in petitioning for exceptions to be made for just such students. I would not want to suggest that the academic achievers with high grade point average be excluded from opportunities for independent work, for clearly they need this, too, and perhaps especially so since their independence of spirit needs particularly to be fostered.

The independence of our creative subjects appears to have been fostered by parents who, very early, showed an extraordinary respect for the child and confidence in his ability to do what was appropriate. The expectation of the parent that the child would act independently but reasonably and responsibly appears to have contributed much to the latter's sense of personal autonomy which was to develop later to such a marked degree.

Let it be noted, however, that these parents did not leave the life space of the child unstructured. Within the family there existed clear standards of conduct and ideas as to what was right and wrong, but at the same time there was an expectation, if not requirement, of active exploration by the child and the internalization of a framework of personal conduct. Discipline was almost always consistent and predictable.

In most cases there were rules, family standards, and parental injunctions which were known explicitly by the children and seldom infringed. Thus there appear to have been both structure and freedom which carried with it expectations of reasonable and responsible action.

This parental policy, I submit, is a far different thing from the kind of permissiveness which is so often granted by parents and also demanded by children today. Extreme permissiveness means the absence of standards and a lack of structure of the child's life space with the consequence that he does not know who he is, where he stands, or what he can or should do. Small wonder then that alienation and anxiety are so often his fate.

I am inclined to believe that the college or the university that can create an atmosphere similar to that of the homes of those who were to become so highly creative would, by that alone, contribute importantly to nurturing the creative potential of its students. And this, I would note, is different from the kind of unstructured campus which some seek today, a campus on which no rules regulate the manner, time, and place for the activities appropriate to college life.

There is another aspect of the early life space of our creative subjects that is especially worthy of notice. In addition to the mother and father, the larger familial sphere also provided a plentiful supply of diverse and effective models with whom the child could make important identifications--grandfathers, uncles, aunts, and others who occupied prominent and responsible positions within their community. Whatever the emotional relation between father and son, whether distant, harmonious, or turbulent, the father generally presented a model of effective and resourceful behavior in an exceptionally demanding career. What is perhaps more significant, however, is the high incidence of distinctly autonomous mothers who had active lives and interests and sometimes careers of their own apart from their husbands.

The college might similarly foster the creative potential of its students by offering a plentiful supply of diverse and effective models--teachers who are themselves effectively creative persons.

But, more specifically, what is it that the instructor-models can offer that will nurture the creative potential of their students? For one thing, they can offer a deep appreciation of the theoretical and esthetic ways of thinking, for these, we find, are the two values most highly prized by outstandingly creative persons. A student is on firmer ground in dealing with facts and things than in grappling with theoretical concepts and issues, and many will be tempted to remain in such safe territory. But if their creative potential is to be realized they must be encouraged to think abstractly and to concern themselves with concepts and issues construed in abstract and symbolic terms. In research, and especially in basic research, one must venture into the realm of abstract thinking. Thus, one of the great advantages in participating in research as an undergraduate is that the student is encouraged to develop theoretical interests.

Of course, there is nothing magical about mere participation in research; its consequences for the student depend upon the conditions under which it occurs. If the professor treats the student largely as a laboratory assistant or technician, as someone to do "the dirty work" in handling objects and things, while he reserves the thinking for himself, the gain to the student will be minimal and the student's time might be better spent in more conventional course work.

On the other hand, the professor can greatly encourage the development of the student's theoretical interests if he treats the student as a full collaborator in all phases of the research and most importantly in its conceptualization and planning or, even better, encourages the student to formulate his own problem and to design his own research. A professor of this type, one who places high value on theoretical issues, provides the student with a model with which he can identify, and, thus, gives him confidence to develop his own theoretical interests.

From association with such a professor, more appropriately designated a guide or mentor or a true exemplar, the student experiences something of the delight and joy and fresh insights which come from confidence in thinking abstractly and in exercising one's skills. He is motivated to acquire through study and hard work the theoretical know-how, knowledge, and competencies which, alone, provide grounds for confidence in setting for himself ever more challenging problems in the field of his interest.

Although some have stressed the incompatibility and conflict of theoretical and esthetic interests, it would appear that he who would nurture creativity must foster a rich development of both, for the truly creative person is not satisfied with the solutions to his problems unless they are also esthetically pleasing, unless, to use the mathematician's term, they are elegant. He demands of his work that it be simultaneously true and beautiful. The esthetic viewpoint permeates much of the work of the creative person, and it should find expression in the teaching of all skills, disciplines, and professions if creativity is to be nurtured.

Among the more salient characteristics of the creative person are a breadth of cultural and intellectual interests, an openness to his own feelings and emotions, a sensitive intellect, and an understanding self-awareness.

The implications of these findings for the nurturing of creativity are rather clear, it seems to me, and especially so for vocational training. We should not seek to train our students too narrowly, or only for the practice of a profession, although tradition distinguishes between the liberal arts colleges which do not prepare their students for any particular career and the professional schools which train their students for the practice of a particular vocation. John Arnold might have said that liberal arts colleges seek to produce generalists, professional schools specialists. We find that regardless of whether our creative subjects were educated in liberal arts colleges or trained in professional schools or had the benefits of both kinds of learning they, more than their less creative peers, reveal an awareness both of the inner self and outer world and an inclination to give expression to most aspects of inner experience and character, admitting into consciousness and behavior much which others would repress, integrating reason and passion, and reconciling the rational and irrational.

I believe we would all agree that most professional training is not designed to foster such liberation of the human spirit as characterizes our creative subjects. And I think we would also agree that just because a course is taught in a liberal arts curriculum does not guarantee it will have a liberating influence on the student. Any course, no matter what its content, can be taught in a rigid and stultifying manner, or it can be designed to encourage awareness of one's impulses and a freeing of one's imagination. I would argue, however, that increased esthetic sensitivity, self-awareness, and imaginativeness are more likely to be engendered by a study of the arts, humanities, and the social and behavioral sciences, by courses in literature, history, poetry and drama, in the psychology of personality, and the sociology of ideas than by professional training. In such areas of human experience the student most easily can be brought to an awareness of the meaning and uses of analogy, simile, and metaphor, or the symbolic equivalents of varied experience, the delights and possibilities in imaginative play, and of the place of human experience in the cosmic scheme.

Considering this, I would suggest that in professional education, the creative potential of students perhaps can be fostered best by broadening their experience in fields far beyond their specialties. Instead of viewing such wanderings as distractions, we would do better to think of them as providing the student with that variety and richness of experience without which the highest levels of creative achievement are unlikely to be reached.

Although especially perceptive and open to experience, the creative person, like everyone else, must also judge and evaluate his experience, but it is clear that his preferred mode is that of perceiving rather than judging. The difficulty with judging is that one may come to prejudge, thus excluding from perception large areas of experience. Since critical judgment is emphasized so much in higher education, we need to emphasize the opposite, if we are to foster creativity. We will do well to discuss with our students, at least occasionally, the most fantastic ideas and possibilities. Discipline and self-control are also necessary. One must learn to exercise them, to be truly creative, but it is important that they not be overlearned. Furthermore, there is a time and place for the learning and use of discipline and self-control, but having been learned, they should be used flexibly not rigidly or compulsively.

In our research we have found that creative persons not only are open to experience but are intuitive about it. We can train students to be accurate in their perceptions and logical in their reasoning, and these, too, are characteristics of the creative person. But can we train students to be intuitive, and if so, how? I suggest that we can do so by emphasizing the transfer of training from one subject to another, by searching for common principles, by seeking relations among quite different domains of knowledge, stressing thinking in terms of analogies, similes, and metaphors, seeking symbolic equivalents of experience in the widest possible number of sensory and imaginal modalities, engaging in imaginative play, and by training in retreating from the facts in order to see them in larger perspective and in relation to more aspects of this larger context.

You will note that in the latter part of this presentation I have discussed the implications of our studies for the education of students as though they are rather obvious. These suggestions seem reasonable to me, but I would remind you that they are only questionable hypotheses to be tested. I have not so much described new practices as I have pointed to a few out of many more which I believe should be more extensively employed. They surely have been used by some instructors, at least part of the time, with some students in some colleges--but how widely or how consistently or how effectively nobody knows. For that reason it remains a question in my mind whether educating for creativity is or is not a modern myth.

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PAUL HEIST

Creative Students: College Transients

I met Lisa early in her sophomore year. While I was trying to gain admission to the office of the student newspaper on her campus, she happened by and asked, congenially, "Could I help?" I explained that I was looking for some recent copies of the campus paper. She brushed her long, dark hair back over her shoulders, thought for a moment, tried the door which I had already found locked, and then said, "Oh, follow me."

Walking around the building, she reached up to push open a window and, in ungainly fashion, started to crawl in. Since this was more of a feat than she anticipated, she said, with a laugh, "Won't you give me a shove?" I complied, a bit embarrassed, by trying to lend a discreet hand. Together we managed, and after a minute or two she came out through the door with copies of every issue.

As she handed them to me, she announced that she knew I was "one of those researchers" studying her class. I introduced myself, asked for her name and year in school, thanked her, and moved on. Later our liaison person on that campus described Lisa's family background, spoke of her high ability, her rather unusual habits, her excellent freshman year record, and predicted that she probably would not find enough challenge on this campus to satisfy her.

Later, in Berkeley, some information in our files revealed some interesting aspects about the life of this 18-year-old. She was from a home representing a high level of culture and intellectual concern. Her scores on several tests tagged her as an autonomous, mature, and sophisticated young woman with very strong intellectual and esthetic interests. She also had strong needs to be free, unfettered, and independent. This led me to wonder, if a girl like Lisa wasn't excited and challenged in the excellent college in which she was enrolled, then where would she find intellectual stimulation?

The prediction about Lisa came true much sooner than one would have guessed then. In February of the same school year, I encountered Lisa near the University of California campus in Berkeley. She spoke about her disappointment with the college she had attended, saying that she was not going to return and that she wanted to spend the rest of the spring wandering in the Bay Area. She explained that she wanted to look at the world and the people in it and think about what was important about living.

I saw her for the last time one and one-half years later at a small, private New York gallery where Lisa had a number of her paintings hung in a show. We chatted about her present way of life, her dissatisfaction with education in general, her involvement with a recent civil rights protest movement, and her concern about desegregation in New York City and this country. She also commented about her desire to express herself through painting and told of her plans to go to Europe to study and paint.

Recently an acquaintance reported that Lisa had returned from Europe and has won acclaim as a young artist in New York.

Lisa, with Scholastic Aptitude Test scores above 750 on both verbal and mathematical subtests and with all the measurable characteristics of recognized creative persons, found her way in life without completing a formal education. Anyone acquainted with Lisa probably would agree she was a sophisticated and educated young adult. One also might have to concede that for her there would have been little to gain from additional years of structured curricula or intensive academic pursuits. In fact, as she related, she had not found college an exciting, expanding experience. In her words, "My year and one-half of college was a tight, insensitive routine, with the only real challenge coming from two or three fellow students and one class in literature."

This brief biographical sketch of a few years in the life of Lisa is drawn from a larger body of information about her and from files on a sample of students from whom we collected similar information over recent years at the Berkeley Center for the Study of Higher Education. These individuals were initially in the entering classes in a small number of institutions cooperating in a special study of one generation of students. An early investigation revealed the attrition of many capable students. The dropout and transfer phenomena stimulated an interest in the fate of students with seemingly great potential, in the sense that they were talented and creative and often very bright. Our interest in certain types of students interviewed was intensified by becoming acquainted with them--their backgrounds, thoughts, attitudes, and accomplishments--but even more because of the atypicality of many and their deviant and transient college careers.

One of the special types, if it can be categorized as such, was the "creative" we encountered in interviews or met under other circumstances, as in the case of Lisa, or later identified by use of criterion data. The fact that the creative students, as much as any other identifiable type, tended to disappear from the campuses where we first met them led to a more intensive concern about them and their academic activity and records. Much of what we came to understand about creative and potentially creative students--their interests, needs, frustrations, as well as their pursuits and productivity--came from talking with them, observing them, and speaking with their associates. Both their leave taking and frequently expressed dissatisfaction helped us formulate questions about their special characteristics as related to their educational experiences.

Thus, the stories of two other creative personalities, selected from quite different campuses, probably will serve to place the problem in a meaningful context, before we examine available data.

Karen was introduced to us during her sophomore year while working as a waitress in the campus cafeteria. After serving the dinner, she asked why we were visiting her campus. A brief explanation satisfied her only temporarily; at dinner the next evening she asked more questions. The following day she noticed us in the coffee shop and came over to join us. We were informed that she enrolled in a church-affiliated college chiefly because her missionary father wanted her "to attend my old school." Her first-choice college had been an eastern girls' school, which she had seen as a good place to pursue a career in the arts. She spoke of this choice as being a bit "dreamy-eyed," since all of this made little sense to her parents, who argued that the only proper education for their children could be found within a school of their religious denomination. More than that, her father thought that the arts were not proper subjects to study in college and didn't lead to a job.

Although Karen was very neat and quite attractive, her appearance was unique on this campus where decorum in dress prevailed. Her long hair, her low-heeled sandals, and her somewhat offbeat attire reminiscent of Oriental dress were cues to her distinctiveness. As my colleague commented in a later interview summary, she dressed and walked "with simplicity and beauty."

On a later visit near the end of the same school year, I learned that Karen made all her own clothes, and that she had spent her first 14 or 15 years in the Orient. The dean of women informed me that Karen had been quite unhappy during her first year on campus, and that she had sought out a faculty member during her second year for help in transferring to another college or to the local state university. Karen felt obliged to write her parents about her plans. Following this, the dean's office discouraged her resorting to a "controversial" faculty member as counselor and confidant. Thus, her transfer attempt never moved beyond serious exploration.

During her junior year, Karen was added to a supplementary interview sample of students identified as creative through measured personality characteristics. In the context of this additional information, the "pattern" of Karen's life gradually was revealed. In spite of her parents' wishes and admonishments, Karen had attempted to major in painting and sculpture, with a minor in music. The graphic arts program at that time was not extensive enough to lead to a complete major, but she decided to settle for as much work as she could get. Because of her disappointment with "the narrowness of the music department," she sought to round out her course work in literature and language during her junior and senior years.

During her junior year Karen sought to express herself in writing short stories on her own. As a senior, she was asked by the editor of the campus paper to write a column on campus life. Occasionally her columns were humorous but pointed criticisms of the administration and college policies, and some of the inadequacies of the education received on this campus.

During her senior year, Karen confessed that her biggest disappointment was that this "good college" did not permit a person to major in dance or even study it to any appreciable degree. She described the dance program as "ladylike calisthenics" and said that "the developments in modern dance have never crossed the state boundaries."

Karen found, at the beginning of her last semester, that due to her scattered sampling of courses she probably would not have enough concentrated credits to graduate in June. Her advisor later said that when Karen heard of this from him, she laughed "almost hysterically" for about a minute and then shouted, "Isn't that wonderful!" Less than a week later Karen's roommate brought to the dean a note she had received from Karen, wishing her good luck, congratulating her on her June graduation, and ending, "I'm leaving for the real world." Our story on Karen has not gone much beyond that point.

The third person drawn from the sample of identified creative students in our files is Peter, whom we became aware of through a routine review of information and test scores from one entering class. These students were enrolled in a school of science and technology, one of the most selective colleges in the country, and Peter stood high in the class in both scholastic aptitude and previous achievement. His measured personality characteristics marked him as one of five in his class of over 150 students with high potential for original and innovative thought. Through college records released to us we found that Peter had achieved recognition by the time he entered college. He had published two research reports while in high school. From his experience in a small, home chemistry laboratory since junior high days and his studies in a special area, he was more advanced, at least in chemistry, than others in his entering college class. The story of this young man is one of general success if the B.S. degree is used as the criterion. Peter obtained excellent grades throughout most of the four years and was one of the majority in his entering class who satisfactorily completed all requirements.

We interviewed Peter during his third year in college and twice following graduation. His overall reactions to college, as drawn from these interviews, can be summarized as general dissatisfaction. However, although never very happy about his courses or the instruction, he rarely had given serious thought to transferring. It was readily apparent that he was not a perpetual malcontent or griper. His analyses of what he saw as inadequate in his education and as faults in the institution's program were rational and astute.

From the beginning of his college career, he received excellent grades in his major field, and his peers learned to respect his scholastic achievement. Nevertheless, he reported twice that only one professor indicated having seen or read his earlier research reports, although the campus newspaper highlighted his former studies during his second year. Until late in his junior year, no one in the chemistry department spoke with him about a future in chemistry. In fact, said Peter, "No one ever spoke with me as if I might be a young scientist now, let alone treated me as if I might become a future research scientist. Nor did we get any class work in the first three years that smacked of real research or taught us how to conduct it." He went on to say, "One professor once lectured to us for several sessions about the necessity of spending years learning the fundamental material, and he argued that research in the sciences could not be understood or done until all the essential foundation work had been completed."

In his first three college years, Peter developed new interests and pursued others developed before college. As he found growing satisfaction in playing in a woodwind ensemble, he began to skip classes to practice on his instrument. Late in his second year he "discovered" philosophy and, although he had only taken one course, he began to read widely in this field during his third year. During this period he began to question his religious beliefs and wrote a series of papers in which he examined the concerns and questions underlying this change in his life. By the beginning of his senior year he also realized he didn't want to continue in chemistry following graduation. At this late date he considered switching his major to physics. He explained that he had found no room for original thinking in chemistry, at least as taught the first three years, and he had encountered much more flexibility in an advanced physics course. This decision probably was influenced by a favorite physics professor who discussed with him the metaphysical frontiers of modern physics and astronomy.

To bring this story to a close, Peter had his poorest year in the way of grades during his fourth year. During the previous summer he read avidly in several fields and also a variety of historical and contemporary fiction. During the last year, he went back to writing poetry, given up since his high school days. He finished his work in chemistry with a critical paper, chiefly directed to how this subject could be taught so as to cultivate a research orientation and essential research skills. The following fall the physical sciences lost an innovative lad; Peter enrolled in a distant graduate school in the field of philosophy.

To summarize, the experiences of these three persons were similar to the experiences of numerous other students whom we identified as having unusual creative potential. A surprising number of young women left the college world after one or two years, as did Lisa, or moved from one campus to another, seemingly seeking an education that did not exist. Some, like Karen, felt or knew that they were in the "wrong" institution but, through a combination of circumstances, seemed unable to move to a more appropriate setting. Others, as did Peter, finished out their undergraduate careers, frustrated and dissatisfied for the most part at not receiving what they expected in the way of a meaningful education, and eventually moved into other majors or other media to gratify their needs for expression and involvement.

THE TRANSIENCY OF IDENTIFIED CREATIVES

The information from the folders of a few interviewees cannot be used as a source of defensible facts. However, the data that follow for larger numbers of students become viable when understood as being representative of individuals.

Some staff members at the Berkeley Center became interested in the loss or mobility of college students of exceptional ability and talent in the course of a continuing survey of college careers of the first group of National Merit Scholarship winners. When the first Merit Scholarship students (1956) made their initial choice of institutions to attend, they tended to distribute themselves nonrandomly, with very large proportions of these bright young men and women attending colleges and universities with the best academic reputations. These students who selected the highly touted institutions were a rather special breed (Center for Study of Higher Education, 1962). The outstanding men and women, when compared to matched samples of students in institutions ranking significantly lower in quality, were found to be more intellectually and esthetically oriented and more interested in the theoretical and abstract. In general, many exhibited characteristics associated with creative behavior.

During the followup surveys of the second and third years, a withdrawal trend was noted in the exceptional students who selected the better schools. Among these students, who seemed to be well matched with their particular institutions, some outstanding men and women transferred to other institutions while others dropped out entirely, at least for a while. This early trend was not pursued or studied as part of the continuing National Merit Scholarship project, but the finding was predictive of research results to come.

A year or two after observing this loss of National Merit Scholars from excellent institutions, early results in two other studies at the Center began to lend verification to this withdrawal phenomenon. Both studies, which included reputable, highly respected institutions, dramatically illustrated the concentration of exceptional students in excellent schools and the high incidence of withdrawal of achieving students, including a surprising number who were or could be categorized as persons of high creative potential. These observations were first given substantiating evidence in the results obtained in a collaborative project between the Berkeley Center and a selective school of science.

LOSS OF CREATIVES FROM A SCHOOL OF SCIENCE

In this study, a surprisingly large number of men in one class were identified as having some definitive characteristics of creative people and many of them were among those transferring in the first two years. This unexpected finding grew out of a special followup study of early dropouts from this institution.

In the four-year study, the AVL Study of Values (Allport, Vernon, Lindzey, 1951) was administered to entering freshmen. Results obtained on this instrument revealed a significant difference in the pattern of scores on four scales between a high-achieving, dropout group and dropouts of near average or low achievement. Most high-achieving students were significantly above the normative mean on the Theoretical and Aesthetic scales, especially when these two scales are viewed as a pair, and considerably below the mean on the Economic and Religious scales. More significantly, this pattern or combination of mean scores for this particular group of men (see figure 1) was as extreme or deviant from the norm as any scores we had seen for any selected or unselected group of male or female college students.

	Theo.	Econ.	Aes.	Rel.	
Mean Scores (Standard Deviations)	53.3 (6.7)	33.7 (7.4)	46.5 (6.9)	31.4 (9.0)	High
	50.9 (5.6)	39.9 (7.9)	35.5 (6.6)	37.3 (9.6)	Low

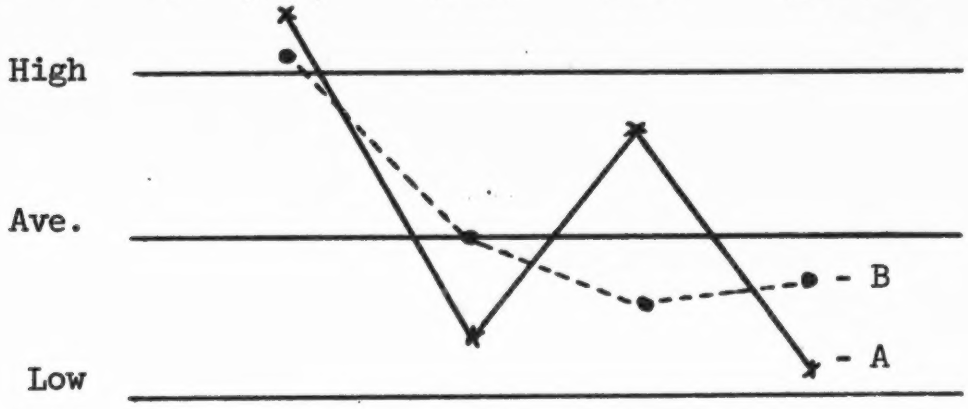

Figure 1. Score patterns on AVL Study of Values for high-achieving (A) and low-achieving (B) dropouts at a school of science.

The particular method of identification of the creative students in this one institution provides no assurance of actual creative production by the people identified, if and when they have the opportunity to perform as the criterion scores would indicate. However, this pattern of four scores on the Study of Values (AVL) (see Appendix A) for the high-achieving dropouts was almost identical to the one reported by MacKinnon (1960) as typifying the values of recognized creative adults in several different fields. Nevertheless, it is a matter of concern that this school and the science disciplines were losing a large proportion of capable and innovative persons that the institution could ill afford to lose.

Reviewing the AVL scores and profiles of the individual students disclosed that 73 per cent of the high-achieving dropouts matched or exceeded this creative pattern as compared to only 20 per cent of the lower achieving group. The obvious question here was, Why was such a large proportion of bright, achieving students with presumably high creative potential leaving this extraordinary institution of science education, along with other students with less creative potential? To conclude that they were leaving for the same reasons would be open to serious question.

A review of the AVL profiles of all students in the particular class indicated that a majority of very bright, potentially creative students had withdrawn by the end of two years. Those who remained into the third year--some 17 students with comparable profiles, but lower verbal and numerical aptitude scores than the creatives who withdrew--tended to complete all four years. At the end of four years, all but two of these remaining students were still there to graduate. These 15 students represented 13 per cent of the graduating class.

Among the total number of dropouts at the end of four years, more than one-third (38 per cent) could be typified by the creative profile graphed in figure 1. Of the total of 39 entering students identified as creatives, 61 per cent withdrew or, at least, did not finish in four years. Of the 131 students not so identified by the AVL patterns, only 30 per cent withdrew or did not complete their work in four years. These results are shown in table 1.

Table 1. Creative and Noncreative Students Who Graduated or Dropped Out of a School of Science

	Identified Student Types (AVL Patterns)					
	Creatives		Noncreatives		Total Class	
	No.	(%)	No.	(%)	No.	(%)
Graduates (4 years)	15	(39%)	92	(70%)	107	(63%)
Dropouts	24	(61%)	39	(30%)	63	(37%)
Totals	39	(100%)	131	(100%)	170	(100%)

LOSS OF CREATIVES FROM LIBERAL ARTS COLLEGES

The loss of exceptional students, as observed in the quite different samples mentioned before, resulted in questions and tentative hypotheses about the records of such students in various educational settings. For example, the very characteristics of bright young people with a strong liberal orientation, or of highly motivated creatives with a frequent need to seek new experiences and to express themselves, might be closely related to dissatisfaction with particular institutions or to faulty relationships with faculty and administrators. A free-swinging, innovative creative in most small four-year colleges would undoubtedly engender apprehension and encounter great reaction from peers and faculty and often be seen as too different. The high-ability student with these same traits, when caught up in the demanding regimen of a strong science program, might be seen as troublesome and misplaced. From the standpoint of the creative student, a small college with restrictive, inflexible policies or a science institute requiring much drill and learning of fundamentals probably would operate at cross purposes with his needs and mode of learning.

These speculations were amplified rather early in a study of students in a varied sampling of eight institutions. This study was initiated shortly after the loss of the creative type was noted in the study of male science students. Within the context of this second, larger project, a special study of creatives and their records was conducted in half of the institutional sample--four selective liberal arts colleges.

These colleges all lost a variety of excellent students, classified as such on the basis of their precollege records and the results of first-year interviews. This loss first became apparent when students were not available for the second-year interviews. Additional evidence was forthcoming during the third and fourth years of this long-range study. Among those withdrawing from the institutions in this investigation of a generation of students, we found numerous persons with the highest ability scores, many with serious intellectual interests and, not infrequently, with high potential for creative expression.

This finding, in line with some results from earlier studies, led to a more extensive examination of the loss of creatives. In three of the four selective liberal arts colleges a lengthy procedure was used to identify the most creative students by peer and faculty nominations. This identification process resulted in two levels or categories of creatives, those with "highest" and those with "high" potential. For the most part, persons were nominated whose creativity had been made evident, for example, in the form of short stories, poetry, paintings, papers presented in seminars, or through their thinking and styles of living. On each campus at least 20 peers (persons in the same class) were interviewed and given a definition of creativity by which to assess their classmates. Whenever a fellow student was nominated on a basis of six times out of ten (listed 12 or more times by the 20 peers interviewed), he or she was placed in the highest classification. Others nominated between three and five times were placed in a high category. The faculty nominations were used largely to check their agreement or disagreement with the student nominations.

This procedure of identifying the creatives resulted in a total of only 21 women and 25 men in the top (highest) category on these three campuses, which enrolled many exceptional young persons. The 21 women rated as highest on creativity also had strong intellectual orientations and very high aptitude scores. As a group, they were above the 95th percentile on the Scholastic Aptitude Test average (verbal and mathematical scores combined and divided by two). But, astonishingly enough, at the end of the fourth year only two of these capable persons remained to graduate from the college they entered four years earlier.

For those women ranking high, rather than highest, in creativity, the loss was also very severe; all these women (N = 23) also ranked high on a measure of intellectual orientation, but only six of them graduated. The loss of creative men, categorized as both highest and high, and also ranking high on intellectual orientation, was not as great as it was for the women, although in two of the institutions, the dropouts among these young, innovative intellectuals totaled more than 50 per cent.

These losses of exceptional students, in several colleges noted for their academic quality, generated more specific questions about the types of students who tended to finish or leave and about the programs and instruction in the institutions they were leaving. We wondered whether these three schools recruited and enrolled an unusually large number of students with high creative potential, that is, in addition to those persons identified as creative by their peers. We were curious about the withdrawal rates on these campuses for all other persons who might be categorized as potentially creative.

The identification of the potentially creative students among all the entering students in these colleges was accomplished by "reading" the students' pattern of scores on eight scales in the Omnibus Personality Inventory. This inventory was constructed chiefly to assess some personality characteristics or patterns of attitudes hypothesized to be meaningful and important in the lives of students in an academic environment (Center for the Study of Higher Education, 1962).

The specific scales on which the scores differentiated between creative students (those nominated by peers and faculty) and sample students not so identified in the same institutions are Thinking Introversion, Theoretical Orientation, Estheticism, Complexity, Autonomy, Religious Liberalism, Impulse Expression, and Schizoid Functioning. These scales had been included in the OPI initially to assess the following: the quality and degree of academic interest (measured by several scales), authoritarian thinking, and degree of impulsiveness, alienation, and emotional disturbance. The scores for the identified creatives on all scales ranged between the 70th and 90th percentiles.

The combined high scores on the first four scales (falling near the 90th percentile on three of them) denote the strong intellectual interests and concerns of the men and women represented. The intellectuality of these creative persons is, however, somewhat different from that of another group--identified young scholars. The latter students had higher scores on Thinking Introversion and Theoretical Orientation than those identified as creatives. Although a theoretical, analytical orientation is not absent among creatives, it is superseded by an interest in ideas, reflective and philosophical thought, esthetic sensitivities, and a tolerance for the ambiguous and unstructured (the latter measured by the Complexity scale).

The combination of the Autonomy and Religious Liberalism scales serves as a dual measure of non-authoritarian thinking. Persons scoring high on both are cognitively, if not emotionally, released from their own subcultural pasts; they are much less judgmental and exhibit greater independence in their thinking than those scoring below the normative mean. They also are freer to examine new ideas and attempt new and different experiences. Persons typified by the level of the mean scores (70th to 90th percentile) obtained by creatives on these two scales generally profess definite values and feel very strongly about certain ethical considerations, but they seldom subscribe to the beliefs and practices of the orthodox Christian denominations.

The mean score for creatives on the Impulse Expression scale represents a wholesome level of impulsiveness and an above average need to express oneself and to seek self-gratification. This impulsivity is complemented by the relatively high mean score on the Schizoid Functioning scale, which, together with the former, denote an above average amount of psychic energy, tension, and anxiety. These scores also imply some feelings of alienation and/or a willingness to disaffiliate from others. However, the two scores at the indicated levels do not imply emotional disturbance or neuroses.

Returning to the general identification of creative and potentially creative students within this small number of select colleges, the process of identification utilized criterion patterns for assigning students to two levels or categories of potential creativity. The criterion pattern consisted of the OPI scores and profiles of those students who were nominated or rated highest for the creativity recognized in their accomplishments or behavior. The mean scores profile for the males in colleges A, B, and C who were nominated as being the most creative is graphed in figure 2 (this profile is nearly identical to the one for the nominated women in these three colleges). The second profile in figure 2 represents students who were majoring in music

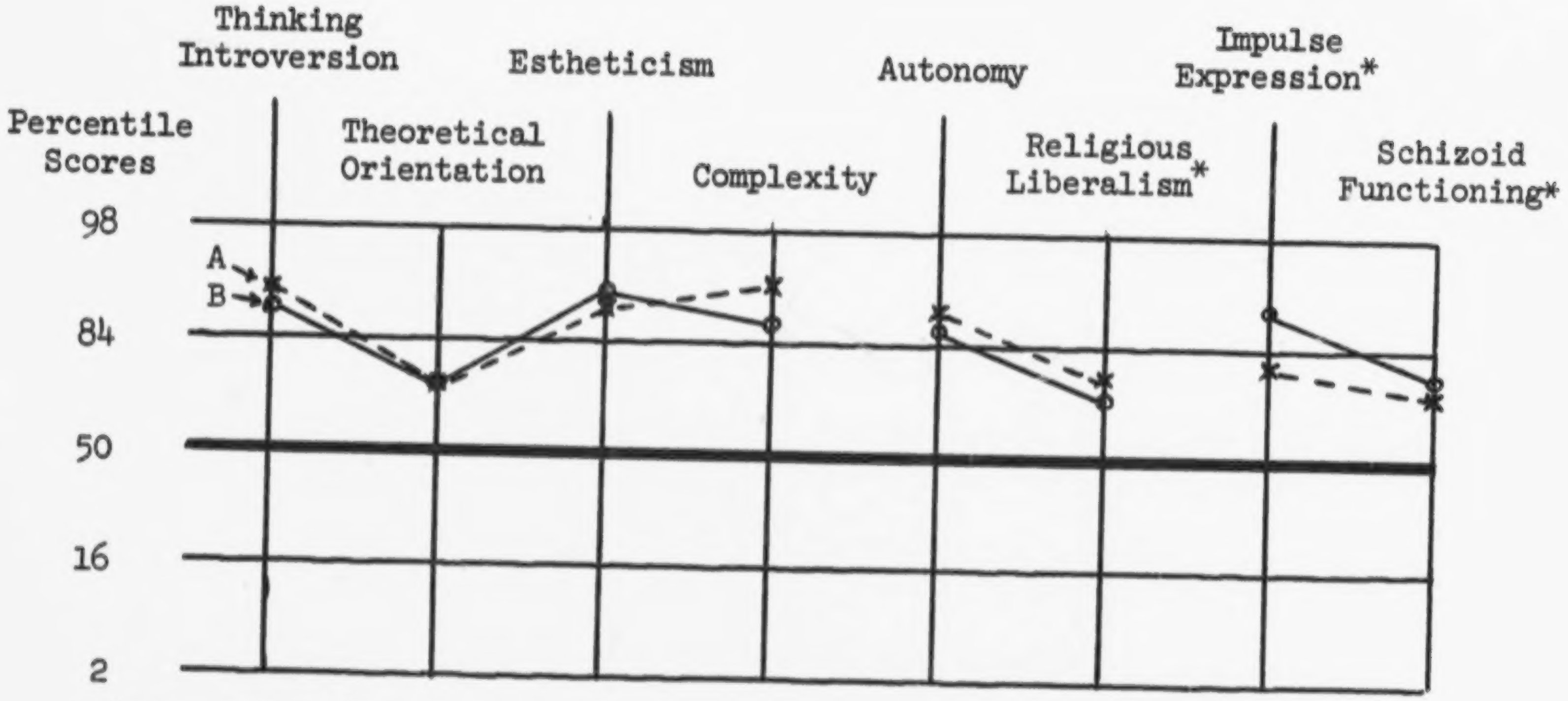

Figure 2. OPI (Forms C and D) scores and profiles for: (A) 20 males, ranked as highest on creative potential, in three selective colleges, and (B) 25 male and female arts majors, rated as highest in creative expression by members of the faculty, in three other colleges. On the scales indicated by an asterisk the mean scores represent only 15 persons in two (B) colleges.

and the graphic arts in several other schools not included in this study. These persons represented in the second profile were rated as high on a creativity dimension by the members of the faculty in their respective departments. Both men and women are represented in this second profile. Duplication in approximate scores and patterns in the two profiles substantiates the validity of the identifications, as well as the similarity of the needs, attitudes, and interests of the highly creative.

Those students identified as having the highest creative potential were those who had a set of scores on the composite scales that matched or superseded the criterion profile pattern. The students categorized as high did not completely meet all the criteria of the pattern of scores. Certain qualifications or adjustments on several scales within the criterion pattern were basic to the secondary classification. These were related to academic major or religious belief. For example, rigid adherence to the suggested criteria derived from the scores (Estheticism, Complexity, and Religious Orientation scales) of those nominated as the highest creatives would preclude identification of some potential creatives with strong science interests or firm religious commitments.

To return to the underlying concern about the loss of creative students: Do the majority of those students with the measured correlates of creativity (potential creatives) tend to leave as was the case with those ranked creative by peers and faculty? The data in table 2 indicate the answer to be mostly in the affirmative.

The figures in table 2 permit a few inferences about the differences in the proportions of creatives among the four schools. One could conclude tentatively that the total percentage of potential creatives in an institution is related to its public image, which often derives from sociopsychological characteristics of an institution, its program emphases, and the characteristics of the students. In unique and distinctive

Table 2. Percentages of Potentially Creative Students in Four Selective Colleges and the Percentages of Students in One Class Who Withdrew Before the Fourth Year

Student Categories	College A (197) M	F	College B (390) M	F	College C (242) M	F	College D (587) M	F
Entering students with high potential for creativity	37	37	20	40	17	30	8	7
Creatives withdrawing	62	81	59	74	56	49	48	54
Noncreatives withdrawing	43	58	49	67	33	22	44	51
Levels of significance	.02	.02	Not significant		.05	.02	Not significant	

institutions the students often have become an important aspect of the total image, positive or negative. The syndrome of personality characteristics found in identified creatives may well be a strong factor in the operational image of some institutions. For example, an institution regarded as liberal and intellectual and as having a large percentage of creative students may consistently attract liberal, intellectually oriented students--and a large percentage of creatives.

Also, differences in proportions of creative students lead to questions about the possible influence of creative types on their peers and the psychological climate of a campus. Colleges A, B, and C could be described as having more than their share of creative youth as compared to college D. The college D figures of 8 per cent and 7 per cent for entering creative men and women probably are more typical of the proportion to be found in most colleges and universities. One might speculate, for example, that since the range of acquaintance is wider on smaller campuses, and since college D is more than twice as large as A and C, the possibilities for reciprocal nurturance of creative personalities are much greater at both A and C, than they are at D.

However, judging by the withdrawal rates and facts from this one class in each school, being among the small number of potential creatives does not seem to weaken the chances of graduating from college D. The rates for the loss of creatives in colleges D and B, in these particular classes, were not higher than the rate of withdrawal for all other students in these schools. However, among the other two colleges, which enroll students of somewhat higher ability than B and D, the data for this one generation of students indicate that noncreatives tend to fare better and withdraw in somewhat smaller numbers than the creatives. The most general conclusion to be drawn across these four colleges is that creative potential and opportunity for reciprocal nurturance of creativity do not improve the chances of completing an education.

When the highest creatives are considered as separate from the total of both levels, highest and high, the percentage of students who withdraw is increased in almost all cases. For example, the number of highest creative males dropping out of colleges A and C increases from two out of three to three out of every four persons, or to 75 per cent. The number of women in colleges C and D increases from one out of two to two out of three and three out of four, approximating the figures for colleges A and B for all women creatives.

One additional observation relates to the difference in withdrawal rates between the sexes. A limited range in the percentages (48 per cent to 62 per cent) exists among creative men in the four colleges. The differences, however, among the women are large enough (49 per cent to 81 per cent) to suggest considering the impact of dissimilar campus environments and the varying sources and means of satisfaction to be found in these institutions. Answers to some speculations could be approached through other data and information available on the students and the colleges. For example, the results of interviewing indicated that women seem to find the environment and climate more inhospitable and threatening at colleges A and B than they do at C and D, although, paradoxically, colleges C and D impose more sociopsychological structure and more regulations and restrictions. But, such "findings" will have to remain at the conjectural level pending similar analyses in other schools.

The data shown in table 3 represent a first attempt in this direction, in which similar assessments of entering students in three quite different private institutions permitted some replicative analyses of the findings for the students in colleges A, B, and C (table 2). College N is a selective women's college with a heavy emphasis on both the liberal and creative arts. College R, a coeducational liberal arts institution, is still quite strongly affiliated with a Protestant denomination, and college Z is a selective school of science education.

Table 3. Percentages of Potentially Creative Students in One Class in Dissimilar Institutions and the Percentages of Students Withdrawing before the Fourth Year (Significant at .01 level)

Student Categories		College N (Women--122)		College R (Coed--321)		College Z (Men--178)*	
Entering students with high potential for creativity	Highest	11.5	63	2	9	4	15
	High	51.5		7		11	
Creatives withdrawing			53		73		64
Noncreatives withdrawing			28		47		36
Total proportion withdrawing from specific classes			44		54		41

*Number represents two classes on which the essential information was available.

The students in the three colleges vary significantly in aptitude, from the 97th to the 65th percentile, with the men in college Z scoring considerably above the women in college N, and the latter somewhat above R. But, again, the differences in ability are not in line with the differences in the proportions of students with potential for creative expression as identified by their scores on eight scales of the OPI. A very high proportion (65 per cent) of students categorized as creatives enter the women's college (N). This may reflect either an extraordinary process of self-selection by the applicants or a special recruitment and admissions policy by the school. As one might guess, it is one of a number of women's colleges with a rather distinctive image. If this percentage of creative girls is typical of its first-year classes, in all likelihood the image will be maintained.

In contrast, the much smaller proportion of creatives in the coeducational institution (R) is probably close to being typical of most good denominational colleges. This institution is much like college D in table 2, in size, caliber of students, and type of program.

Statistics in the school of science (Z), based on the records of two classes over four years' time, indicate that a relatively small proportion (15 per cent) of persons could be labeled creative among these very bright males who entered with excellent high school academic records. But, as with college R, a majority (64 per cent) of these men withdrew, mostly in the first or second year. Again, the percentage of creatives leaving is much larger than the 36 per cent of noncreatives who withdrew. Recalling the breadth of cognitive-intellectual experiences supposedly sought by creatives, it is probably not surprising that men of this orientation leave a curriculum comprised of only four science majors. In line with their broader perspectives and interest in the theoretical and abstract, the 11 out of 27 creative men still present in the fourth year were concentrated in the more theoretical fields (five in physics, four in mathematics, two in chemistry, and none in engineering).

The large concentration of potentially creative women in college N provides a more advantageous sample, as well as setting, for examining several questions. Does the seemingly good match between the students and the program relate to persistence? Are the learning and creative experiences sufficiently rewarding to hold the type of student who tends to leave a variety of other colleges? Do the most creative young women (highest versus high) tend to leave this selective place as readily as the exceptional women in the selective liberal arts colleges, as shown in table 2?

A little more than one-half the potentially creative women left college N, as compared to 44 per cent of the total class and 28 per cent of those not identified as creative. The 53 per cent of the creatives withdrawing represent 76 per cent of the total withdrawal sample. Thus, a large majority of those who left this particular selective college might also be described as the very ones who presumably would profit the most from continuing their education in this program. The highest creatives were almost entirely lost from college R, as the six persons in this category all left. But in colleges N and Z, half of the highest group withdrew, and half were still enrolled during the fourth year.

Interpretations of the exploratory analyses presented might well vary. However, the high dropout rate for all ranked or identified as creative students, averaging about two out of three across the seven institutions compared, suggests that intelligent, creative youth tend not to finish in their colleges of original choice in numbers equivalent to the noncreative men and women.

HOW CREATIVE STUDENTS SEE THEIR EDUCATION

Many of the students identified as creative or potentially creative did graduate from college. It was especially interesting to discover how 15 recognized creative graduates from five colleges, interviewed several times over four years, reacted to their education and the schools from which they received their degrees. The students' summarized comments that follow were in response to several questions about their education and academic experiences.

It seems safe to assume that analyses of educational experiences by those who completed their education would tend to be less critical and negative than the reports from creative students who withdrew from the same institutions. Those who finished had a broader sampling of experiences upon which to base their evaluations and criticisms. This borrowed perspective has been limited to observations and points frequently repeated.

The most frequent reactions, from 12 students in at least four of the five schools, dealt with a described rigidity or inflexibility of the "system." In this respect, they spoke critically of colleges as organizations and referred to webs of trivial regulations and established, traditional curricula which seemed to change very little.

A majority of men and women spoke of the pressures and constraints on their time and lives. This complaint, discussed by those from all but one campus, was chiefly the result of the increasing academic demands and a vague "press" experienced and transmitted by instructors and students. The press was related to the amount of work assigned, the expanding reading lists, and the increasingly superficial treatment accorded subject matter.

The students also frequently discussed the quality of teachers, instructional methods, and student-teacher relations at some length. A near consensus among these exceptional students seemed to be that they felt lucky to have one really good teacher per term. The general quality of instruction was described as mediocre. Few teachers "were alive, hep to the real world, and understanding of students" and "thoroughly involved in the process of teaching." Said one talented young man who majored in physics: "What a profession of squares.'

On two campuses, several exceptional students felt there were opportunities for student research in the undergraduate years but that teachers didn't do much to encourage this, nor did teachers include the students in their research.

Almost all students were dissatisfied that their college education and experiences did not approach their expectations. The pursuit of self-knowledge, hobbies, individual interests, and outside reading were abandoned for lack of time. Meeting deadlines and following a schedule determined by teachers, week after week, were subjects of frequent complaint.

Most of these students found their on-campus experiences, especially in their last two years, to be a pretty straight-and-narrow grind. One person referred to a "deadly routine," in which the upperclassmen traveled in a narrower and narrower channel. None of the 15 interviewees spoke of any novelty, challenge, or esthetic stimulation in their last year's programs. Some students seemed to beat the mundane routine by noncurricular involvements, but generally at a cost to their course work and grade records.

Several students indicated that what seemed to be lacking were opportunities to be involved in the wealth of living and the excitement of learning things of personal interest. To them, college education seemed an enforced detour which kept them from essential perceptual and emotional satisfactions. These feelings and frustrations perhaps were related to their attempts to bring more of "life" to themselves, in the form of controversial or risk-taking experiences. With their need for expression and experimentation blocked in the academic area, these students sought other means to utilize or test their intellect, commitments, and emotions. These activities--not always appreciated by peers and superiors--included giving leadership to protest activities against local campus administrative policies. Some students wrote letters and columns of criticism and prepared clever, colorful posters urging campus involvement in discussion and action concerning issues of civil rights and national foreign policy. This preceded by several years the crescendo of student civil rights activity in the South and the general protest activities on many U. S. campuses.

SUMMARY

Students who drop out or transfer from their college of original choice, the latter seemingly a growing phenomenon, have been studied in a variety of educational settings. Academic difficulty, an inevitable concomitant of traditional grading practices, continues to be a chief reason for much student transiency. However, many students, at all levels of ability and frequently achieving very well, tend to transfer or leave college.

The findings from several projects at the Center for the Study of Higher Education provided information about the surprising number of young people of exceptional ability and talent who become dissatisfied with their first-choice college and leave. Among such withdrawing students in two long-range studies, large percentages were identified as having high potential for creative involvement and expression. This loss of creative persons from a small number of selective liberal arts colleges led to further investigation of the situation in the same and other institutions.

The proportions of identified creatives withdrawing, as observed in seven quite dissimilar institutions, ranged from approximately 50 per cent to 80 per cent. In five out of seven of the particular institutions included in these analyses, a significantly higher proportion of the creative students on each campus left than was the case with dropout students not so identified. The major conclusion to be drawn from the data is that the students ranked as creative or identified by measured characteristics of creativity leave some colleges more frequently than or as frequently as do all other students not so identified.

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BENSON R. SNYDER

How Creative Students Fare in Science

Our definitions of creativity are interwoven with our values, our views of man, and our notions of what constitutes a good society. There is a further problem. Creativity in the arts may well be very different from creative activity in science and engineering. The need for closure, for making a commitment to one of several possible solutions, may be more crucial in the undergraduate education of engineers than in the education of scientists. The student scientist may have and need greater sanction and freedom for intellectual risk taking than his engineer counterpart. This raises the interesting possibility that creative solutions or formulations by engineers may involve "intolerance" rather than "tolerance" for ambiguity. Creative activity for student engineers may involve a cognitive and emotional style that differs significantly from that of nascent scientists. One style is not better than the other. Simply, creative activity for the engineer and the scientist may be qualitatively very different undertakings.

A further distinction needs to be made. It is plausible that an antagonism may exist between professionalism--achieving professional status in the arts, science, and engineering--and developing creative competence in these fields. Education may focus more on the former than the latter.

For this discussion I have defined "creativity" arbitrarily by using an operational statement of creativity derived from three scales on the Omnibus Personality Inventory (Appendix B), developed at the

Center for Research and Development in Higher Education. Some data on how an entire entering class at Massachusetts Institute of Technology (MIT) scored on the OPI permitted us to give limited and circumspect answers to the following questions: What happens to creative students at an institution which focuses on engineering and science? What is the effect of such an institution on creativity?

There is a series of subsidiary questions which should be kept in mind as this discussion unfolds: (1) What bearing does the institutional setting and, in fact, the larger social system have on the functioning of individuals with creative talent? (2) How does the creative individual interact with persons who form a meaningful part of his environment? (3) Is the creative individual psychologically free to leave the group of which he is a member? Does his creative activity provoke the group's disapproval or praise? To put this another way, does the creative individual derive his major source of self-esteem from the group of which he is a member or from the sense of mastery that may be associated with creativity itself? (4) What are the inherent supports and stresses in a social system that influence the development of creative talent? To what extent do certain social structures, value systems, and educational encounters foster or impede creative thought?

Probably the variety of academic communities provides significantly different environments for the creative artist and the creative scientist. Especially in a science-oriented university there is high group approval for the innovator, the man who questions basic formulations and comes up with a new synthesis of theory. This is particularly evident when a new theory leads to a new piece of engineering hardware. On the other hand, there are examples of creative artists in liberal arts colleges who meet with a crushing ostracism from their immediate environment precisely because of their creative efforts.

IDENTIFICATION OF CREATIVE STUDENTS

The OPI was given to 721 MIT freshmen in September of 1961 as one part of a study of student adaptation. Three of the OPI scales were selected as having a probable relationship to creativity and originality. The use of the OPI to identify creative students was reviewed with the authors of the Inventory. More than three scales have been found to be correlates of creative behavior, but the three selected seem to be the most appropriate and adequate for identification purposes in a science program. The definitions of these scales were stated by myself and by two colleagues. The research group reviewed all items comprising each scale and then stated those inferences on which they achieved consensus.

The Thinking Introversion scale of the OPI was defined as measuring the individual's emphasis on ideas and philosophies, thought as opposed to action. The items on this scale express several major themes. The most prominent theme (expressed by twelve items or 20 per cent of the total) is: deriving pleasure from actively engaging in analytic, deductive, and synthesizing thinking. Another theme is: excitement in intellectual activity generally. The scale shows that the respondents' commitment to ideas is not, however, at the expense of interpersonal relationships. Although interested in ideas and thinking, high scorers also indicate active concern with the human condition. High scorers appear to think of themselves as autonomous, not bound by group pressure, and prefer to arrive at conclusions independently. The statements in this definition were arrived at empirically by constructing a matrix and rating all 60 items against the dimensions.

The items in the Complexity scale were inferred to measure a desire for, or seeking out of, new, complex, social, and cognitive experience. This appears to be associated with disinterest in the conventional, well-ordered and regulated, simple, and certain life. The individual scoring high on this scale probably prefers to try new ways of doing things and enjoys new experiences. Ideas appeal to this individual more than facts, and "fooling around" with ideas is not considered a waste of time. High scorers on this scale do not "need" clear-cut, unambiguous answers and certainty of outcomes. Freedom to invest time in intellectual risk taking, in playing with ideas, may be a crucial factor in their makeup. Low scorers appear to prefer a well-ordered life with everything in its place, and express a need for tangible results. There is an implication that low scorers carefully and conservatively budget their time.

As noted earlier, the engineer's task may require individuals who seek concrete results and order. A regulated life actually may enable the engineer to take risks that are appropriate to his cognitive tasks. Seventy-two per cent of the students responded "false" to the question, "I have always hated regulations." Yet, 70 per cent of all students at MIT responding to a second item are characterized by deriving some pleasure from "fooling around with new ideas." As indicated on two additional Complexity items, ideas appeal to these students more than facts, and trying out new solutions appeals more than using known ways of doing things. They do not appear to need certainty of solution to work on a problem.

The Impulse Expression scale was assumed to measure apparent pleasure in either conscious thought or action, or in action itself (as excitement mounts there appears to be an increasing pressure for immediate gratification of impulse to act, with relative intolerance of delay). High scorers probably will show less reliance on set schedule, orderliness in dress, or conventionality in attitudes. Several of the items comprising this scale refer to aggressive or sexual impulses. High scorers on this scale will acknowledge the novel, radical, or rebellious adventure with exhibitionist flavor. Manipulation or control of others is a secondary theme reflected in at least seven items. Both socialized and controlled expression of impulse, together with more infantile impulse expressions, also are included in this scale.

CHARACTERISTICS OF MIT STUDENTS

This presentation will focus on trends and describe the findings in qualitative rather than quantitative terms. However, the mean scores for the three OPI scales just mentioned for 721 members of the freshman class tested in September 1961 provide a point of reference. The Thinking Introversion mean is 54.6 on a standard scale. The Complexity score is 56.2, and the Impulse Expression score is 52.5. (The intercorrelation between the Complexity and Thinking Introversion scales is .48. The intercorrelation between the Complexity and Impulse Expression scales is also .48, while the intercorrelation between the Impulse Expression and Thinking Introversion scales is .02.)

To locate these MIT means with respect to higher education generally, they were compared with means on the same scales obtained at several other institutions. Thinking Introversion and Complexity means show a similar pattern. The MIT Thinking Introversion and Complexity means are above those means of a liberal arts Ivy League men's college and two West Coast state universities. The MIT means are below the means of three relatively small, academically oriented liberal arts colleges--in the East, in the Middle West, and on the West Coast.

Comparison of the MIT means on the Impulse Expression scale with these same schools, however, reveals a different pattern from that found with Thinking Introversion and Complexity means. The MIT Impulse Expression mean is at the same level as the mean for the liberal arts Ivy League men's college in the East, the academically oriented eastern liberal arts college, and one of the state universities in the West. The MIT Impulse Expression mean is below the mean for Impulse Expression at one state university in the West and considerably below that of the other state university in the West, and also well below that of the two western liberal arts colleges' Impulse Expression means. Thus, MIT students do not have high Impulse Expression scores with respect to liberal arts colleges of academic excellence.

Comparisons with other educational institutions indicate that the MIT group is closer to the students at two small liberal arts colleges than to students at two large universities or an Ivy League men's college. There is considerable internal diversity in the MIT student population. The educational, psychological, and social experiences of the students as they move through four years at MIT are certainly not uniform. Different paths through the institution have different hurdles and different tasks, requiring different patterns of coping and different adaptive responses.

The mean scores of students in engineering, mathematics, and physics at MIT were compared with students from the same fields at another highly competitive and demanding technological institution and with the National Merit Scholars for the year 1961. The Thinking Introversion mean for the MIT class is slightly below that of the other technical school and the National Merit Scholars, while the Complexity mean is moderately above that of the other institution and significantly above the mean for National Merit Scholars. The same trend is apparent in mathematics majors, although the difference between the Thinking Introversion means of the MIT class and the National Merit Scholars is not as great as on the Complexity scale. This same pattern characterizes the physics students in these three groups. The physics majors at both MIT and at the other technical institution have Complexity means that are considerably above the means of engineering students at both institutions. Mathematics majors at both institutions fall between these two groups, with higher means than engineering majors.

The mean scores for the entire freshman class on the three scales in question show an interesting pattern by the time these students reach their third term and select their major fields. The Thinking Introversion and Complexity scales means in engineering are consistently below these means in science. The Impulse Expression means in engineering are slightly higher than in science for the same period. Humanities and social sciences have a pattern more like the scientists than the engineers.

I will not describe in detail the changes in means for this population which occurred by the end of the senior year except to note that the greatest increase on the Complexity scale occurred among students in one engineering course. This particular major had a design project course in the junior year in which the professor literally told the students, "Let yourselves go; make a mistake." Students in only two science courses, plus the humanities and architecture majors, had higher third term Complexity means than did students who either withdrew or were disqualified. This same pattern of relatively high Complexity score students withdrawing holds through the eighth term. This suggests that there may be a more rigorous filter through which the students pass in the first year. The institutional toll on high-scoring creative students tends to occur early rather than late.

Certain institutional characteristics are relevant here. At MIT, the engineering students move in and out of their fields less frequently than do science majors. Social science and humanities majors have the greatest degree of movement across fields. Another way of putting this, the probability of a student staying in a particular engineering major for four years is higher than the probability of a student staying in a science major. The probability that the engineering major will stay in engineering is considerably higher than that for the student remaining in the humanities or social sciences.

HOW CREATIVE STUDENTS FARE

Let us return now to the two major questions, leaving the subsidiary queries for later discussion. What happens to the creative student at an institution of higher education which focuses on science and engineering, and what is the effect of the institution on the development of his creativity.

To determine the fate of the creative student at MIT, let us compare two extreme groups. The study identified students with freshman scores of 1½ standard deviations (approximately 40 percentile points) above and below the MIT mean on the three OPI scales mentioned before. What happened to these two groups as they moved through four years in the institution? How many left? How many stayed? In what fields did they major? For those that remained for the entire period, what was their final cumulative grade average?

A note of caution is in order against drawing inferences too rapidly and readily from the data. At present, the actual relationship is unknown between the operational definitions of the OPI scales and actual creative performance as undergraduates or the students' creative activity following graduation.

In the extreme groups on the Thinking Introversion scale are 60 students with means below a standard score of 41 (16th percentile) and 40 students with means above a standard score of 68 (90th percentile). On the Complexity scale are 56 students with means below 40, and 59 students with means above 72. There are 51 students with means below 36, and 68 students with means above 68 on the Impulse Expression scale. The percentage of students leaving the institution through withdrawal or disqualification is higher in the high-scoring group on all three scales than in the low-scoring group, significant at the .01 level. The trend is clear. Students scoring high on the Thinking Introversion, Complexity, and Impulse Expression scales are more likely to leave the institution than low-scoring students.

Although the academic preparation and the scholastic aptitude scores of these two groups have not yet been correlated with OPI data, preliminary review suggests a negative correlation. This gives one cause to question what it is the institution asks of these high-scoring students that they fail to do or choose not to do. It suggests that an institutional filter may be operating to screen out the more creative students from the institution, but more from some fields than others. An interesting possibility raised by Dean Gordon Brown of MIT is that the high scorers on these OPI scales may be individuals who have adolescent expectations and attitudes about engineering or science which are challenged by the harsh reality of the various disciplines themselves. Another possibility is that science curricula are too limited to meet their expanding needs and interests.

Students in the low Complexity, low Thinking Introversion, or low Impulse Expression groups tend to stay in one course for their entire time at MIT when compared with the entire class. This trend toward "stability in place" is even more dramatic when these low-scoring students are compared with the high-scoring groups on these scales. This, as noted, partly reflects the fact that the engineers: (1) stay in one course more than any other group and (2) have lower mean scores on two of these scales than the other groups. There is no significant difference in the cumulative grade point average at the end of four years between the low- and high-scoring groups on Complexity or Thinking Introversion scales. However, the low Impulse Expression group has a significantly higher final cumulative average than the high Impulse Expression group. Thus, the greater the restriction of impulse, the higher the grade.

However, the situation is more complicated. To anticipate our test-retest material, the one scale that shows a significant increase in means over four years is the Impulse Expression scale. The correlation between the Impulse Expression scale and the grade is considerably higher in freshman year than in any other year. There is a similar, though less dramatic correlation, between high Complexity scores and low grades in the first year, which does not persist at a statistically significant level beyond the third term; this is further evidence for the hypothesis that the first year may have a different set of cognitive hurdles from the last three years.

To summarize so far, the institution is losing three times as many students who preferred as freshmen to try out new solutions, fool around with ideas, or take cognitive risks as it is students preferring a well-ordered life with tangible results. However, such a gross statement, inferred from the operational definition of the Complexity scale, may be subject to question.

Nevertheless, the data justify a continued curiosity about just what the institution does or does not do for these students who are, at admission, risk takers and appear to have an intellectual itch. When these students stay in the institution, they achieve essentially the same final grade point averages as their more cognitively conservative classmates.

When we look at these students with extreme freshman scores, who stayed at MIT through their senior year, still another trend becomes apparent. One-half of the high scorers on the Complexity scale were in the field of science, while one-sixth of the seniors were in science. Our high Complexity student, then, if he stayed in the institution, was most likely to be found in the school of science. An instructive exception has already been noted; the engineering course that explicitly rewarded risk taking had a greater number of students who had high Complexity scores as freshmen than did other fields.

We have, in the most general terms, seen what happens to the highly creative student, as temporarily defined here, as he moves into and through the institution. The major loss of these students occurs in the first year and one-half, and those who stay take paths through the institution that are different from their less creative peers. From the data presented so far it is impossible to say whether their actual life experiences at the institution differ significantly. Much more information is necessary concerning what actually happens in the classroom, in the lecture, and in the dorm.

EFFECT OF THE INSTITUTION

The freshman arrives, and within the first week his expectations are challenged by a considerable input of less public, informal, if not private, information. He becomes aware that very fine discriminations are being made on the basis of the shoes he wears, the cut of his clothes and his hair, and the tone of the voice. The student receives a great deal of semiprivate information on the social and psychological climate he has entered. There are strong pressures on the student to "swallow it," as one freshman put it. The stress here is social and psychological and impinges on the student's inner sense of self; whether he puts on external signs of a particular identity, such as readymade clothes, obviously depends on many factors. This represents a stress for most students, and the stresses (pressures operating toward conformity) lie as much in invisible as in the formal curriculum, probably even more in the former than in the latter. The unique solutions that students develop have consequences that may extend far beyond the freshman week. The quizzes and the grading of the informal, invisible curriculum are covert but compelling. The student with the demands of this curriculum unresolved then goes to class and hears still other voices challenging him to look at his preconceptions. The cognitive stress of the classroom can and probably often should be profound, but there is undoubtedly more to the picture than this. To illustrate the range, subtlety, and complexity of stresses in the student, consider the following example of the highly creative, risk-taking student's first confrontation with both the visible and invisible curricula.

The student goes to lecture and hears from his professor that the course in question is exciting. Much independent thought will be demanded. He is urged to think about the subject, reflect on what he reads, and develop skepticism. However, the first quiz, in the student's eyes, calls for the playback of a large number of discrete facts. The message that the student hears is that "reflection and original thought are for the birds; memorization will get the A." Some possible outcomes in terms of the student's response to such dissonance would include cynicism about the academic enterprise, a determination to play the academic game with shrewdness, alienation, or conformity to the task of getting grades.

Having considered, however briefly, the effect of the institution on creative students, let us turn to the institution's effect on the development of creativity. Some 213 seniors, 30 per cent of those who had taken the OPI as freshmen, came back in their last term and retook the OPI. After four years at MIT, Thinking Introversion means went down. The Complexity means show almost no difference between the freshman and senior years. The Impulse Expression means show significant increases by the senior year.

The increase on the Impulse Expression scale means suggests that the senior sample has significantly less reliance on set schedules or conventional attitudes after four years at the institution. The seniors acknowledge wanting novel, radical, or rebellious adventures far more than when they were freshmen.

It is well to be cautious about drawing inferences that are too grand, too expansive. It is impossible to say whether the seniors are expressing more infantile impulses more freely or have developed a higher degree of socialized, controlled expression of impulse than they had as freshmen. This is obviously a crucial question but we cannot resolve it with the data at hand.

While the Complexity scale scores do not go up, it is also important to note that they do not drop. A more careful look at various clusters of students who had changes on the Complexity scale should reveal whether any interesting differences emerge. The drop of the seniors' scores on Thought Introversion, although not dramatic, is intriguing. As the students move on toward graduation, there may be less introversion and more proclivity to action. The data hardly warrant the judgment that the students are deriving less pleasure from deductive or analytic thinking, or from intellectual activity in general. It is possible that the drop in the Thinking Introversion mean after four years may well reflect the students' increased socialization to a more regulated, orderly, and planned academic life, as inferred from shifts in their cognitive style and intellectual interests. Such a formulation is not necessarily in contradiction with the noted increase in the Impulse Expression mean over the same period.

Rigorous criteria were applied to determine significant change in the various OPI scores from freshman to senior years; a difference of at least two standard errors of measurement between the freshman and eighth term scores was considered necessary before a change was considered significant. Applying these criteria, those students showing significant increases or decreases were combined with those from the test-retest sample whose freshman scores were significantly above or below the freshman mean. Thus, one group contains students who started out and remained high on a given scale or students whose scores increased significantly on that scale. This group was compared with its converse, those students who started out and remained low on a given scale or those students whose scores decreased significantly on that particular scale.

Spending four years at this institution appears to be associated with striking stability of the Complexity scale, a significant increase on Impulse Expression, and a decrease in the senior means on the Thinking Introversion scale. It is possible that these scales, particularly the Impulse Expression and Thought Introversion scales, reflect adaptive responses of the students to different aspects of the educational culture in which they were living, rather than "inherent" traits. Whatever complexity indicates, it may be more an inherent psychological trait, quality of mind, or characteristic response of the individual to ambiguity than those qualities measured by the other scales.

There are far fewer students with a significant change in their Complexity scale scores than is the case with the other two scales. The small number of students whose Complexity scores significantly increase almost equals the number whose scores decrease. The increase group has a final grade point average of B, slightly below the decrease group final average of A-.

At the time of the study, the school of science had more than twice as many high Complexity students in the senior year as low Complexity students. The school of engineering had twice as many low Complexity students as high at the same point in time. As noted, the high Complexity students studied have a final grade point average slightly below that of the low Complexity group. This is further evidence that the mastery of the separate cognitive psychological tasks in these two curricula have different emotional and social consequences. Maintaining delight in complexity may be at some cost in grades.

The trend of the entire test-retest sample of increase in the Impulse Expression mean over four years is impressive and occurs without regard to school. Fifty-three students show significant increase while only four show significant decrease on Impulse Expression. The 11 students who as freshmen had significantly low Impulse Expression scores and who showed no change as seniors achieved a considerably higher grade point average at graduation than the 13 students with high freshman and high senior Impulse Expression scores. This suggests that the student who can delay impulse at age 18 probably will receive better grades than the student who has some difficulty controlling his impulses.

A careful appraisal of the freshman year is currently underway. The options and choices open to freshmen have been dramatically expanded. It will be interesting to see whether the relationship between Impulse Expression scores and grade point average is altered. The change in Impulse Expression scores may represent emotional development and growth associated with the move from adolescence to adulthood, rather than a response to the immediate educational environment. Further work, however, is necessary.

STUDENT VIEWS

Let us move now from data derived from tests to the accounts given by two students of their moves through college. They spoke directly to the issues that concern us: the institution's impact on highly creative students and the institution's role in developing creativity in students.

The first is a slight, almost boyish-appearing man in his middle twenties working for his Ph.D. He has finished the experimental work and writing for his thesis and only needs to complete a language requirement to graduate. He has returned to graduate school following a period of employment, during which time he made a major original contribution to his discipline.

As an undergraduate he majored in mathematics, not at MIT. Even though he did well, he graduated feeling he was second-rate since he was eighth, not first, in his graduating class. His roommate and his five closest friends had the five highest scores on a nationwide competitive examination. He was "only" number 30 in the entire country on this examination. Such was his evidence for being second-rate. This discussion will not focus on his life after leaving college, but rather report to you his comments on his college experience. He spoke of students at his college who had come from large, urban high schools. These students performed perfectly for their professors. They gave the answers that the professors wanted; no one in this group, according to this student, attempted to extend knowledge or raise new questions. He felt that all of them, in this regard, were lazy. He had seen his roommate recently and decided to prod and push him to the limit. The roommate, a straight-A student, was one of the "lazy ones." The respondent was curious as to whether he could goad him into thinking up a new solution to an old problem. After some time, his former roommate did come up with an original answer to a difficult scientific problem, avoiding an adequate but less imaginative approach. The roommate explained, however, that this simply took too much time and energy and wasn't worth the push on his part. The respondent, on the other hand, had always been excited by new formulations and had been a pest in always asking questions. He suggested that a study of creative people could benefit greatly from intensive analysis of very bright individuals who are not creative, a suggestion worthy of serious consideration.

The second student smilingly, but correctly, described himself as disadvantaged. He spent one and one-half years "in a fog" at an elite university. Although highly able, he spent almost all of his time keeping, in his words, "afloat." He was terrified that his inadequacies would drown him. The courses were challenging, and his professors genuinely encouraged reflection. But he had not time, or at least he felt he had no time, to do more than prepare the work for the coming day. Coming from hill country in the South, he "stole time to take in the art galleries," was excited by the symphony, hungry for all he could get out of urban life. Actually, only a few hours were stolen out of days, weeks, and months devoted to schoolwork. After losing his scholarship because of a drop in grades, he went to a "third-rate school" which was, he felt, only interested in his getting a working knowledge of the field and obtaining a degree. There was no request to think about the subject matter, to derive first principles. In his view, the informal curriculum demanded only attendance and cognitive servitude.

He easily excelled academically. Most important, he had time to take a job in a lab to compensate for the boredom which he experienced in class. Note the marginal time that was freed by the change in schools. This time permitted him to explore a field in a manner not possible before. As an outgrowth of the job, this student eventually changed his major field. His work involved developing a small, but highly imaginative, workable piece of hardware with important research implications. This experience gave him a sense of competence as well as excitement that he had not known before.

The moral of this account is not a plea for mediocrity or third-rate schools, but to suggest that stress as well as excitement come in unexpected places and must be taken into account in the curriculum and in the planning of the courses. Indeed, this student felt constrained and bored in the initial period at the third-rate school, but he had the freedom which was not formally intended by the system to pursue a question and to become involved. At the first school there was excitement and there were challenging questions, but no time to pursue them.

These two stories, hopefully, will highlight and sharpen the picture that was drawn of an entire class moving through four years at a specific institution. Students develop a variety of strategies to deal with the almost inevitable dissonance between expected present, actual present, and hoped-for future. Certain strategies and solutions used by students have much higher survival value in one academic setting than in another or in one academic field than in another. The institution more than the student sets the odds on the various strategies and coping patterns that will succeed. Further, an invisible curriculum may play as important a role as the formal curriculum in determining which strategies or solutions are maximally adaptive. Those strategies having survival value for the present do not automatically serve the student well in mastering his field or in developing his intellect. It is precisely this that challenges educators to consider the consequences of their curricula for the development of excited, imaginative, and concerned students.

Different colleges have different working models of what they consider students to be. On one campus they are spoken of as plants, to be tended by the gardener dean. On another campus they are sometimes described as the product of the academic machine in the imagery of IBM cards, to be treated gently--neither mutilated nor spindled. The student is an integral part of a dynamic system. His failure, his distress, his creativity or lack thereof is in some measure our failure, our distress, and reflects on our own ability to be creative.

VITTORIO GIANNINI

Nurturing Talent and Creativity in the Arts

It is a pleasure to tell you about some of the things that we are trying to do in the North Carolina School of the Arts. Although I was once a violinist and am now a college administrator, I will speak as a practicing musician and a teacher, as a person who has dedicated his life to music and composition, and as one who intends to dedicate the rest of his life to music and teaching music.

I am qualified to speak only of talented people in music and the arts. I had the good fortune to come from a family of musicians. My father was a singer, my mother was a concert violinist, one sister became a voice teacher at the Curtis Institute, another sister was a world-famous singer, and my brother is a graduate cellist from the Curtis Institute.

In my family, there was always artistic expression, freedom of imagination, and strict discipline. I first encountered talented people as a boy; they were my fellow students when my parents sent me to Milan as a boy of nine to study the violin and later they were my fellow artists. I remained in Milan until I was recalled by the American government during the First World War. Thus, I had many educational advantages important to attainment in the arts.

I have always felt that if you receive something, you must give something in return. As a young man in my interchange with fellow students, I realized that I was, in many ways, more fortunate than most. Not that I was more talented, I assure you, but I was fortunate to have a preparation which circumstances had denied them. I mention this because of the importance I place on the proper educational experiences in the early years.

Upon returning from Europe, at the age of 36, it seemed that during my absence a great stride had been made in our country in the arts. Many people could go to college, to higher educational levels. Schools had developed that were comparable to those anyplace in the world. However, there was still a serious lack of schools offering musical training to talented children at an early age when it is extremely important to receive a special professional training in the performing arts. For years this idea seemed ahead of its time in America.

I decided to enter teaching because I felt that I had a duty to the younger people to give them the benefit of what I learned from my masters and what experience had taught me. I also believed that the learning process was an unending one. I decided that if I were to teach within my own field, I would learn a great deal. I had the good fortune of having many talented musicians as students during my years of teaching composition at Juilliard and Manhattan Institute of Music since 1939 and, since 1954, at the Curtis Institute. I can say now, after 26 years of teaching, that I learned much more from my students than I possibly could have taught them.

IMPORTANCE OF EARLY TRAINING

For the last two years I have been working with a group of outstanding musicians and musicologists to raise the quality and expand the repertoire of music taught in our public schools. This group of musicians believes that human beings possess an innate capacity for appreciation of the better things of life and that this capacity can be developed through exposure. If we expose our young children to the good things in life, they will respond to them.

However, the first time that most of our talented young people--in the arts, that is--are exposed to any music teaching of quality is when they have the good fortune to go to a college where there is a good music department or an excellent dance program. But, this is too late; in music and in dance you must start much earlier. It is not only too late to develop physical and technical competence, but it is late also from a theoretical standpoint. The usual curricular requirements in college level music departments make this clear.

The average liberal arts college has a small music department. There may be some dance and drama, but little instruction in either. The fact that the first-year program in many colleges includes subjects, such as *elementary* ear training, *elementary* harmony, and *elementary* sight singing or sight reading, is evidence of a deficiency in early training. It does not make sense to have elementary arithmetic at the college level for an engineering education. Students are expected to know a great deal about arithmetic and mathematics by the time they enter engineering school. Yet professional schools in the arts--Juilliard, Eastman School of Music, Curtis, and Peabody--not only have introductory courses at advanced levels, but also elementary courses to accommodate students with inadequate backgrounds. In these remedial courses, students do elementary work. So, what happens to a college curriculum when we try to crowd into four years that which should take at least eight, or perhaps ten? To cover the necessary amount of material, it is very superficially presented and superficially learned. College educators naturally feel the need to go on to higher studies and advanced work and so skim basic studies. At this advanced level, we expect the student to learn the elementary and the secondary level elements of music, and we still expect him to come out with an understanding of what is happening in the present day. Thus, many so-called musicians and other artists have a smattering of knowledge instead of a real understanding and command of their arts.

Students in the performing arts must become virtuosos in their particular disciplines if they wish to present first-rate performances and achieve quality of expression. And this applies also in composition, playwriting, and in poetry. Persons may have great creative gifts, but they also must make of themselves instruments--the finest, the most delicate and sensitive instruments--through which great flights of imagination, great flights of the spirit can be projected to the listener or reader. But the development of such virtuosity is very difficult with the suggested deficiencies in early musical education and in the music departments of most colleges and universities. When one also considers the requirements of other course work in an academic program and general academic pressure in the liberal arts college, it becomes evident that college training in the arts falls far short of the professional school program.

ROLES OF THE PROFESSIONAL SCHOOL AND LIBERAL ARTS COLLEGES

I am quite impressed with the American colleges, the work they do, and what is accomplished under present conditions. But another very important consideration is the student per se. There is a difference, which seems essential, between the music and art students in liberal arts colleges and those in professional schools. In professional schools, a music student is admitted on the basis of talent in his art; in the colleges, nonmusic majors as well as music majors participate in many music activities. I have been to colleges where the college orchestra was composed of 50 or 60 people, perhaps 20 of whom were music majors. This is fine. But if we wish to maintain high standards in art, where are we? A conductor of such an orchestra has no right to expect from the nonmusic major the same standard, the same dedication, that he has every right to demand from the music major. Consequently, we have a compromise of standards.

There is a need for what the liberal arts college does, and there is a need for what the professional school does, if we put them in the proper perspective. A professional artist in the performing arts cannot be trained in a typical college or university to an optimum level of performance. However, the liberal arts college has a function in the arts, which may be just as important in our society as the function of the professional training school.

In higher education in general, we should expose all students to the arts, to give them an understanding of the arts. But, this exposure can be like a mass vaccination; some will take to it, some will not. For many it will mean a richer, fuller existence--they will be the audiences of the future. The colleges could educate students to higher levels of appreciation, if they focused their efforts on this aspect and exposed students to first-rate performances of music, dance, and drama, and fine painting and sculpture.

However, a highly talented person in the liberal arts college should be advised to go where he can be in a climate with other talented artists, where he can have the freedom and stimulation that one needs in the arts. More important, he should go where he can have instruction from topflight, performing teacher-artists.

THE NORTH CAROLINA SCHOOL OF THE ARTS

The proper education of the talented student in the arts has been the concern of the North Carolina School of the Arts. This professional school consists of an integrated program on three levels--elementary, high school, and college. Eventually we will institute a postgraduate level. It is the first school of its type in this country. It was established by the state, but it is independent from any other state institution. It has its own board of trustees and is only financially responsible to the governor and the legislature. At present, the state grants only partial subsidy.

The institution consists of four schools or major areas--music, drama and dance, academic studies, and painting and sculpture. It is called the School of the Arts rather than the performing arts because of this inclusive program. This school was set up to teach the highest caliber of student, to be selected only by audition. Candidates are auditioned by the faculty, composed of specialists in these particular fields. Candidates are accepted at any age, if their talent justifies it. They are evaluated by a jury at the end of every year to determine whether they will continue in the school. Thus, admission to the school does not guarantee continuous matriculation.

The school must serve two purposes, especially at the elementary and the high school levels. Therefore, it is important to have top professionalism in the sense of the highest quality teaching and background in the arts and in the academic department.

The high school and elementary day is divided, with half given to the arts and the rest devoted to academic studies. The youngsters have a very stiff program, but we have found already in this first year that generally the students who do superior work in the academic field are doing superior work in the arts. It has been exceptional, to date, to find a highly satisfactory performance in the arts and a much less satisfactory one in the academic division. Even students who initially passed their artistic evaluation but presented poor school records improved their grades in academic subjects during the first semester, while also receiving intensive artistic training. Although the high school academic subjects are all precollege, preparatory courses, the students do not seem to resent the academic work. When they were in their home towns, they had to attend schools where they probably didn't have much chance to play their instruments or practice under competent instruction.

The students often speak of the fun they have in the afternoon under this program. Some say, "I have all morning for my fiddle," or oboe, or whatever it is, and they say that they now like to go to school. "I don't get a lot of junk," (to use their words); "I have real subjects."

However, it is also important during the high school years that talented youngsters be in a climate with students of like minds who share similar desires and dreams. A boy in the eighth grade, when asked whether he was happy here, said, "Oh sure, I'm very happy here."

And I asked, "What has been the most important to you?"

After some time he said, "Well, I come from a small town in the mountains in North Carolina. I have always liked to play the flute. Finally, I got my mom and dad to buy me a flute. But I had trouble in school, because nobody else liked the flute. They liked to play ball, or tease the girls, and the boys used to make fun of me. They used to call me queer and odd. You know, I started to believe that there was something wrong with me. But now I've found out here that there's nothing wrong with me; there're a lot of guys like me."

This development and realization is very important. Even if this boy does not become a flutist, the new experiences and relationships have helped him realize that he is not odd. He is a human being who happens to like to play the flute. In experiences of this nature we see another value in this sort of school.

Students also have an opportunity to learn by exposure. It is then that they learn that what is needed first is the "seed" of talent and secondly, dedication and commitment. They can discover whether this is the only way of life for them. The students need to understand and accept the effort and hard work which goes into creativity and into performance.

An individual does not go into the arts only for the success, the fame, or the acclaim, although, naturally, recognition is welcome and important. Rather, he practices his art chiefly because it is almost a compulsion, a response to a need to accomplish something to the best of one's ability. And this is what we try to encourage.

If, during these high school years, a student concludes after being exposed to the arts that he is in the wrong endeavor, or has other interests, or would prefer an academic education, then we help him transfer to a university or college to pursue some other career. The experience in the professional school has not been wasted since it has served to clarify for this young person exactly what his life is to be. If he decides on something else, it will be with greater certainty and commitment. What he has been exposed to in four or five years of secondary learning in the arts and in our academic program should meet all the requirements for continuing education.

At the college level, we expect students to be fully committed to a professional career in the arts. A desirable ratio of students will give us about two-thirds of our enrollment in high school, with a sprinkling of elementary students and approximately a third at the college level.

Related to this is a hope that the college level enrollment will remain small. By state law we are restricted to a maximum enrollment of 550 to 600. We want teachers to know each of their students. With a ratio of four or five students to each teacher, this becomes a very expensive school. The cost of educating each student is about $4,000 a year. But, I believe that in all good education there must be contact between teacher and student, costly as this may be. It is very important that students in the arts be exposed to a teacher, not only for the contact with the discipline, not only for the admiration they develop for an excellent performer, but for the exposure to the philosophy of the teacher.

We select our faculty with care. We are concerned that they give not only training as musicians or actors or dancers, but also "training" as human beings. This poses numerous problems, as one might surmise. However, our goal in the North Carolina School of the Arts is to create an atmosphere of enthusiasm and dedication, where personal relationships between faculty and students nourish whatever seed is in the student and bring it to fruition. We cannot give students talent but we can expose them to the best and teach them and help them to teach themselves to become artists.

To accomplish this purpose, we wanted people who had proven themselves, not only as performers but also as teachers. I believe that in the arts only a first-class performer can be a first-class teacher. Obviously, this does not mean that every fine performer is a fine instructor; a person also must have certain other qualities and interests.

The two prerequisites of a good teacher can be very simply stated. The first one is: *Know your field or subject thoroughly and keep on learning*. The second is: *Love your students*. With these qualities, knowledge and love, a teacher will be successful.

Fortunately, the idea of our new school and our particular objectives have appealed greatly to many colleagues in the professional arts. For example, during the present two weeks, we are having master classes by Andre Segovia. On our piano faculty we have Howard Abel, an outstanding pianist. As an instructor in conducting we have Saul Kaston.

We have insisted on music, dance, and drama faculty who come out of the performing arts and who will keep up professional engagements. We want someone who teaches and continues performing in his profession. With music and dance this has been easy, since faculty can leave for two or more days, give a performance, and then come back and teach. In obtaining a drama faculty, we have had to use a slightly different system, because if performers are in a show, it is usually for a longer period of time. Therefore, in drama we have a backbone faculty for history, speech, and basic acting. Then we bring in outstanding directors and actors when they are available. Some faculty members are always on campus while others are fulfilling engagements.

OUR OBLIGATIONS TO CREATIVE YOUTH

I have unbounded faith in the younger generation, the talented and the less talented. We read of much that denigrates modern college youth. But we seldom read much about the really good and the exceptional young people. For the thousands that we read about in the paper, there are hundreds of thousands of wonderful young people, full of dedication and commitment. I believe it is a duty for our generation (I am speaking as an artist and composer) to create the opportunity for talented youngsters to obtain top instruction and encounter the challenge of the best.

However, we must start them early enough in the areas where they have talent and skills. *We have to do this at all levels of education, it is too late at the college level.* We must start in high school and, perhaps, in elementary school.

In this conference we are dwelling on higher education and asking what we should do to teach those with creative potential. But, creativity needs to be encouraged earlier than that. It does not suddenly manifest itself at 17 or 18 years. Sometimes it manifests itself at two, three, and four, and this is the time when we must help the young person.

I think we would have fewer dropouts and less juvenile delinquency if we started the youngster at an earlier age in the field of study that seemed to fit his talent. We are probably still using 1860 methods of education for the 1960's. For example, all youngsters are not bookworms and many are not high in verbal aptitude. Some young people are undoubtedly allergic to books, but they might well be very involved and successful if they could be channeled into the kind of activity that suits their makeup and abilities.

We seem to have difficulty realizing this fact in education.

Also, we should not think of creativity only in terms of the arts. Creativity can be expressed in many forms. The term "artist" should be applied not only to one who plays the violin, paints, sculpts, composes, or who is a playwright. There are artists in many walks of life. The quality that we call artistic is that which we appreciate or recognize in various outstanding performances. It is a way of performing the simplest task in an outstanding manner.

We have to teach our youngsters a way of thinking, a way of living. We tend to teach them too many facts, too much from books. We do not teach them to use their minds or to express themselves. I used to tell my students in the very first lesson: This is the book that we are going to use; buy it if you want. If you don't, I don't care, because if you are going to rely on the book to teach you, you don't need me. What I need to teach you is not in the book, it is only the starting point. I must teach you something beyond this if I can. And you must learn something that is beyond what is in the book.

If a student starts to think, even if he thinks incorrectly, I don't mind. At least, if he starts to think, perhaps his thinking will improve and he will reach the right conclusions. And, again, let's be honest; we have no answers. That is why I said earlier that I learned more from my students than I could ever teach them. I did not give my students the answer. I would discuss the question with them as if we were both searching for the answer. Of course, I would try to lead their thinking in logical succession. Sometimes, however, I must confess that the students came to an answer which, in my ignorance, had never occurred to me. Thus, often, the students with their questions and I with my little bit of experience saw further than what I had been seeing. This is what we have to remember in all our teaching, whether it is the arts or something else.

Young people need to be noticed. They need our interest. They need to feel that we care for them, that they are not just filling chairs in a classroom. Students need to feel our genuine concern in their learning and their well-being, if they are to respond. In my contact with students, I have found that if I was interested in their well-being, they gave of their best. This is why I say that we teachers must change the way we teach. If we don't change of our own volition, circumstances are going to make us change, perhaps with great difficulty. This conference is very important as a chance to discuss, to think things through, to share experiences. I have learned a great deal from the participants. We can and must learn continuously. But let's share also with the students, so that they will learn from us and that we, in turn, will learn from them.

RALPH J. GLEASON

Education of the Jazz Virtuoso

I would like to offer two quotations: A lady approached the jazz pianist, Fats Waller, once--legend now has made her a Little Old Lady but she was probably a rich matron--and asked, "What is jazz, Mr. Waller?"

Waller, a patient man, according to the legend, sighed and simply said, "Lady, if you don't know, don't mess with it."

Here is quotation number two: A conservatory alumnus who later became an outstanding jazz pianist, recalls, "the conservatory not only did not encourage but in every way impeded my interest in jazz and in so doing hampered my musical development. For all that I know today, I am obligated most of all to myself."

The first statement is, as I have said, jazz legend. I have heard it attributed to Louis Armstrong, Lester Young, and to Charles Parker, and, possibly, someone is writing an article at this very moment which may attribute it to Charles Mingus or Miles Davis. (I should add parenthetically that if these names are unfamiliar, I hope to make them familiar before I conclude. The very fact of unfamiliarity supports the theme of this presentation.) The second quotation, which damns the formal education apparatus, is a statement made by a Leningrad musician, one of the growing number of young Russians playing jazz music.

The ideas expressed in the two quotations are not unrelated and they certainly have pervaded the thinking in this country, if not the world. "If you don't know, don't mess with it" is the Zen theme of anti-intellectualism that has haunted jazz since its beginning, made it mysterious (redolent of arcane Negro voodoo practices in old New Orleans on Congo Square). It has been used to reinforce the attitude that jazz is primitive music, possibly not music at all, and certainly not worthy of rank with serious music.

The second quotation expresses the conviction that formal education offers nothing to the jazz musician. Miles Davis, a great creative jazz improviser and a charismatic figure in the music world, was a student at Juilliard School of Music in New York for one semester. He spent most of his time downtown on 52nd Street in New York's jazz clubs, listening mostly to alto saxophonist Charles Parker and writing down what he heard on matchbox covers. The next day in the rehearsal hall at Juilliard, he would work out the things he had written down the night before. Naturally, with his focus on music outside of Juilliard, he didn't stay long enough to get a degree. Although only time can prove me right, I believe that it is Davis who will be remembered as a musical genius and not his classmates who continued at the institution.

ORIGINS OF JAZZ

Jazz has been a bastard music, spawned in the brothel, nurtured in the red light district, and always associated with the sporting life. In the beginning, the entire musical world, with rare exception, screamed out against it. "UNSPEAKABLE JAZZ MUST GO!" was a headline in a music magazine in the twenties. Public figures raged against it. The word jazz itself, which I might point out really does have four letters, has been traced back by etymologists to sexual connotations.

Today jazz stands out as a unique American artistic expression, different from that of any other art form. The appeal of jazz is worldwide. Jazz musicians, such as Miles Davis, Sonny Rollins, John Coltrane, Charles Mingus, and Duke Ellington, are treated as artists and cultural giants in every other country of the world. But in this country they are really second-class citizens much of the time, and even when they occasionally escape this lesser status, there is always the anticipation of the next occasion that may bring the trauma and the hurt experienced by all Negro citizens.

In almost every other form of art, certainly in the area of serious music, the American artist is largely indistinguishable from the European. The better he gets the more he seems to resemble another culture's product. The only music which is accepted as art and which is indigenously American is jazz. The better a jazz artist is, the more he sounds like a Negro (if he is not already one), and the very best jazz musicians, with but one or two exceptions, are Negroes. American Negroes made this music. They created it, developed the basic styles, and are still its leading figures. If whites were erased from the history of jazz, the level and quality of jazz would be the same today.

The Negro in America has learned the hard way that no schoolroom really holds much for him. The jazz musician was one of the first to learn this. He might have entered something else had he been white, but being black, music and/or entertainment were ways to make money and ways to grab the "gimmick," of which James Baldwin speaks, and get out. Sociologists may find that the high incidence of superior Negro jazz musicians is related to the high proportion forced into a few fields; the "talented tenth" had fewer alternatives, and thus music got more than its share.

JAZZ AND THE ROLE OF FORMAL EDUCATION

Let's review a list of 10 of the greatest of all jazz musicians. I could list others, all Negroes, similarly qualified, but the general story about their education would be much the same.

Louis Armstrong is a son of the ghetto in New Orleans, a street urchin attracted to music. In his own autobiography, he says he was drawn to music because of the whores and the pimps and their glamorous life (seen from the point of view of his own poverty). He learned his music in an orphans' home and then was taught by other musicians with whom he was working, that is, playing music on the job. The rest came from himself.

Edward Kennedy "Duke" Ellington's achievements include precipitating a cultural crisis because the Pulitzer Prize Board would not honor him. This artist has appeared with numerous symphonies and given concerts in the great music halls of the world. This man, whose father was a house servant in Washington, D. C., did study music in high school and took piano lessons privately, but he has said that he learned, really, from listening to ragtime pianists around Washington. Instead of going to Pratt Institute to study commercial design, he began his phenomenal career as a professional musician in 1918. At 67 he is, I suggest, America's foremost composer.

Charles Parker, who revolutionized the art of jazz as Hemingway revolutionized the art of the novel, studied music in high school like any other kid--he took a couple of semesters of music and played in the school band. At 15 years, he became a high school dropout and launched his professional career in the nightclubs of Kansas City.

John Birks "Dizzy" Gillespie has been sent on long tours of the Middle East and South America as a cultural representative, by the U. S. State Department. He learned his first music from his father, who died when Dizzy was 10 years old. He then studied in high school and later at a Negro agricultural institute. In school, he divided his time between agronomy and music and then left it all to play in Philadelphia nightclubs.

Miles Davis also studied in a Negro high school and then played in bands and went to Juilliard for the one semester.

Thelonious Monk is a pianist who, like Duke Ellington, has achieved that All-American status symbol, a

Time cover story. He studied music privately in New York and had no formal education at all.

Charles Mingus, like the others, studied music in high school and then learned from other musicians. Later, long after his reputation was made, he studied the string bass for awhile with a classical teacher in New York.

Lester Young, whose style on the tenor saxophone opened the door for much of the vital experimentation of modern jazz, was the son of a professional musician and studied with his father and played throughout his teens in his father's band.

Billie Holiday, the only vocalist on my list, is a jazz singer whose style has had the kind of fundamental effect on vocal jazz that the King James Bible has had on English literature. You "hear" her today, although she's been dead since 1959, in the work of Peggy Lee and almost every other female jazz singer. She was the daughter of a guitar player, became a prostitute at 14, and never took a music lesson in her life.

John Coltrane, a tenor saxophonist, is the only one on this list of 10 with any sort of real formal training going beyond individual lessons. He studied in high school and later at two music schools in Philadelphia, the Granoff Studios and Ornstein School of Music.

The examples on this list and others I could suggest reveal what can be found in any close study of serious jazzmen (Duke Ellington has remarked that there is no musician more serious about his music than a jazz musician). They were forced to break away from traditional education to break through and they naturally found their own way outside the academies, outside the orthodoxy of musical education. Jazz musicians created their own, empirical educational system. Why did Miles Davis, one of the most creative musicians of his generation, spend his time at Juilliard playing what he had heard the night before in jazz clubs if not because the opportunities offered him in the classroom were irrelevant.

At the Monterey Jazz Festival a few years ago, J. J. Johnson, a trombonist, conducted a tremendously inspiring work which he had written for orchestra and trombone. He had scored the entire thing himself, and the musicians from the San Francisco Symphony, who had been added to the orchestra for the occasion, were surprised to discover that Johnson, who has had almost no formal musical training, had accomplished this feat while not knowing elementary shortcuts in composition. Obviously, he had never had opportunity to learn them, and they showed him the tricks during the prefestival rehearsals.

Woody Herman, at the end of the forties, recorded Igor Stravinsky's Ebony Concerto. It had been written especially for Herman by the composer, and Stravinsky rehearsed the Herman band for the premiere performance at Carnegie Hall. Stravinsky, amazed with the virtuosity of the men, said to Herman, "If only I had an orchestra like that!" Numerous musicians in jazz are without peer on their instruments in the whole world of music.

Certainly there are some graduates of music schools who have reputations as jazz artists, and many of the younger men today have had some sort of formal training. Much of current jazz is highly complex and exacting; the more complicated it has become, the more sound musical training is demanded. For example, John Lewis, pianist with the Modern Jazz Quartet and an internationally known composer, studied at Manhattan School of Music, and Dave Brubeck studied under Darius Milhaud at Mills College. But Brubeck, a Caucasian, curiously enough, has not had any influence upon other jazz musicians. Brubeck, incidentally, is the only jazz musician I know of who ever studied formally with any of the great classicists.

THE PERCEPTION OF JAZZ AND THE NEGRO MUSICIAN

When President Johnson assembled his culture session at the White House, critic Dwight McDonald attended and subsequently wrote an account of that event in which he mourned the fact that no American composers had been invited. At the end of this long essay, in the usual entertaining Dwight McDonald style, he added that the one bright thing about the White House affair was the presence of Duke Ellington and his orchestra, which played delightfully. Obviously, to Dwight McDonald, jazz musician Duke Ellington is not an American composer. In our society, we simply do not see these musicians nor recognize their accomplishments. We do not know their names.

Here at the University of California--as in nearly all leading educational institutions of this country--jazz is regarded with near horror and definite apprehension. Hertz Hall is one of the most benign places to hear music. I believe I am correct in saying that there has been but one jazz concert in Hertz Hall, and this concert was given last year by several young students. They played the music of Miles Davis, Sonny Rollins, Thelonious Monk, and Charles Parker. However, these composers, although they have played many times in the Bay Area, have never set foot in Hertz Hall or, as far as I know, on the University of California campus. This situation is something like assigning Bach, Mozart, and Stravinsky to play in the Jazz Workshop and Basin Street West (San Francisco) and then having their music played in Hertz Hall only by undergraduates.

Here in Berkeley, as in many cities in this country, the nearest major symphony orchestra periodically gives concerts for the children in elementary and high schools, and the students are excused from their classes to attend the performance. But only when the students themselves have made an effort to bring jazz musicians to their assemblies and, occasionally, to other school affairs, have they been able to hear this form of music. It is never offered to them as part of their cultural enhancement, nor are courses on the understanding and appreciation of jazz included.

Earlier I mentioned the School of Jazz in Leningrad. There was a school of jazz in the United States at one time in Lenox, Massachusetts. Inspired by the

Tanglewood concert series, it continued for several summers in Lenox. The Lenox School of Jazz had the unqualified support of almost all the major jazz musicians. They took time off from concert tours and nightclub engagements to work as teachers there in exchange for room and board. Applications came from all over the world, the waiting list was enormous, and yet the school died for lack of funds. The philanthropic foundations, which reflect the attitudes of the academy and the "Establishment," did not see fit to provide financial help to underwrite this most interesting and exciting experiment.

In Poland, jazz is taught in the public schools, at college and precollege levels. Polish jazz musicians alternate between giving concerts and playing in nightclubs and teaching and performing in the schools on the payroll of the state. Television programs on American jazz and jazz *per se* are part of Polish curriculum.

Yet only last year in this country did the Monterey Jazz Festival fail in its offer to underwrite a $4,000 workshop in jazz education. It was to be under the direction of a music professor from a California state college, and its purpose was to provide high school teachers with a three- or four-day indoctrination in ways and means of teaching jazz to their students. Lists of available recordings, recommended books on jazz, and lectures by musicologists and jazz musicians on the history and theory of jazz were to be offered. Demonstrations of teaching techniques also were planned by adventuresome teachers who, on their own, had worked out ways to instruct in this area, much as jazz musicians have worked out their own ways to play. The only requirement of the Monterey officials was that the workshop give the teachers the usual credits for attendance.

This instructional project was presented to University Extension on the Berkeley campus. The Extension program did not accept it, and the workshop died because no representative of the music department or education department could be found to fulfill the necessary technical role of sponsorship. Therefore, no credits could have been given.

In answer to the direct question, "Why are there no courses in jazz?," a University of California professor of music responded, "We do not offer courses in plumbing either." The university officials are interested in the problems of attrition on this campus.

How do you keep students from dropping out if they feel there is little for them to gain by remaining in school? How often do curricular provisions fail to take into consideration their particular students? The same implied problem seems to be basic to holding some great students in music.

DEVELOPMENTS IN THE ACADEMIC PROGRAM

Some interesting things are being done about the breadth of music programs at some levels in some schools. There are thousands of stage bands today in high schools across the country. A stage band is a euphemism for a jazz band. I have been told that they are called stage bands because they appear on a stage and give concerts, but they really go by this title because if they were called jazz bands the music teachers in the high schools would not be allowed to devote the necessary time and effort to help these groups. They would be discouraged just as the leaders of the jazz band workshop at San Francisco State (which produced Paul Desmond of the Dave Brubeck Quartet, Allen Smith, and John Handy) were discouraged a decade ago.

These stage bands are providing a place for the young people who want to learn something about jazz. But this approach to jazz in some high schools is only a start, and in a second-class, behind-the-barn kind of way. Still, this development in secondary schools is encouraging. And in time it is going to have a definite effect on American music if only because of the sheer numbers of students involved.

There are jazz courses in a few colleges and universities today, but most of these courses are not designed for the creative musician but for the interested nonmusician. In contrast, during the short life of the Lenox School of Jazz, the students studied in classes and privately with the master jazzmen and had the rewarding experience of playing with them. In this situation, a young trumpet player might have Dizzy Gillespie, the great jazz improviser and technician come to him at a rehearsal and say, Never play a C chord in such and such a situation; it sounds wrong and here's why.

On the topic of university music departments, two years ago, the head of a large music department, while discussing the possibility of a jazz course, asked, "Can you teach jazz? Can you teach art? Can you teach a man to be a great composer?" The answer is obvious, and the question would never have been raised if this dean of music understood jazz and this form of spontaneous creativity. He should have realized that it is as much an art as any other music in his department. The basic structure of music, as well as fundamental skills, can be taught. But, just this lack of understanding of what jazz is all about prevents essential communication. Jazz is spontaneous and, like much of American society which it seems to reflect, it is improvisatory. The "art" of jazz and the talent, the creativity of performance, cannot be taught, but colleges can provide the situations where the talent and musicianship might be developed.

The jazz musician learns chiefly by doing. He finds out a few fundamentals about the instrument in which he is interested and then he just leaps in and plays. He gets help from those with whom he plays. Other musicians taught Louis Armstrong how to read music. Other trumpet players showed Dizzy Gillespie breathing tricks. John Coltrane says he learned from playing with Thelonious Monk, Dizzy Gillespie, and Miles Davis. The masters of the art pass on their knowledge to the youth coming after them.

The jazz musician is somewhat unique as a creative artist. He cannot, as can the poet, the painter, and the novelist, practice his art in solitary fashion in the proverbial attic. Most of his playing and practice must be with other musicians, to sharpen his own ideas and responses. He needs support for his own playing in every possible way. Jazz musicians now rehearse together for their mutual education in a sort of underground. Sitting in on practice sessions for a job defies the union rule which demands that musicians be paid for playing. Thus, they do not have the freedom to practice or learn in the only way open to them. They need places where they can gather and work, experiment, practice, and play without interference and without pressures. But these opportunities are not available.

The jazz musician also learns by listening to others, in person and on record. This is true in America and in other countries. In Leningrad, where the opportunities to hear American jazzmen have been piteously few, jazz records are treasured, and tapes for repeated study are made of the Voice of America broadcasts. In Poland, when jazz was forbidden in the early fifties, the jazz musicians held secret underground meetings to listen to tapes. This independent learning and absence of formal institutional teaching--the freedom to listen, experiment, and listen again--has probably produced more flexibility and innovation than would have been the case in formal educational institutions.

THE CREATIVE JAZZ PERFORMANCE

The jazz musician stands up in front of an audience, and he "composes" what he plays as he goes along. He starts with or creates a melodic theme, goes on with a counter melody, and develops a unique composition. It is instant art, a tour de force performance.

When a jazz musician is finding and developing his own style, he must be ingenious and versatile. He must be able to retain in his memory the chord sequences for hundreds of tunes. He must be able to play changes effortlessly and improvise on them, when his time to solo comes, with no chance to go back and correct his mistakes.

In fact, many jazz musicians have made a virtue out of necessity--which is really the story of their music--and have developed a degree of virtuosity so that they can even utilize their mistakes. Dizzy Gillespie, for instance, is known to play a long trumpet phrase, a whirling dervish of notes, and suddenly make a mistake. Immediately his "mental computer" shifts, and what he plays after the mistake makes the mistake itself logical in retrospect.

Some years ago, following a memorable jazz concert at the Hollywood Bowl, pianist Andre Previn was approached by Lukas Foss who inquired whether the musicians had rehearsed the performance for a long time. When Previn said, "No," Foss asked, "But, surely, you have it all worked out?" He was aghast when Previn said, "No, it wasn't worked out at all. The music was made up right there on the spot during the performance." "But what a chance you are taking," Foss continued, "sometimes it must be terrible." And Previn agreed. Sometimes a performance is great and sometimes it is terrible. Such alternatives are inherent in the whole concept of spontaneous improvisation, and the product created, as in many other fields, may be superb in one case and leave much to be desired in another.

This improvisation is even more impressive when one considers the setting in which this art is practiced. The jazz musician often works in saloons, creating his art in front of drunks and talkative customers. He very seldom has even a dressing room in which to relax. Most musicians play through the evening on hot, cramped "stages," with smoke and foul air filling their lungs. The backstage conditions of the New York Metropolitan Opera House, which Rudolph Bing recently criticized so severely in attempting to show the advantages of a new opera house, would be heaven to musicians working in most jazz clubs.

The life of a jazzman is far from easy. Jazz musicians play the job in the honored tradition of show business--the show must go on. Performing under stress and adverse conditions goes on in nightclubs night after night. Jazz musicians play when their bodies have all but collapsed. Erroll Garner recorded one of his greatest albums with one finger in a splint, held out above the piano keys like a pencil. The John Handy Quintet was playing at Stanford University which, incidentally, is the only university ever to offer a full year of jazz programs for students. Suddenly the bass player became ill in the middle of the number, before his solo was due. The solo was taken by the alto saxophonist, while the bass player finished the number, merely keeping time. An intermission was called and after 10 minutes in the open air outside, the musicians returned and completed the program with a performance which brought a standing ovation.

Duke Ellington, whose concert of Sacred Music at Grace Cathedral was one of the musical highlights of San Francisco's 1965 cultural year, for many years has subsidized his orchestra from the royalties of his tunes and records and from other earnings. Ellington calls the orchestra his instrument. He uses it and needs it, he says, to hear the music he writes. And this whole musical "workshop," this great composer and his orchestra, rattle around the world in airplanes and buses, playing nightclubs, dances, concerts, and TV shows, with Ellington working all the while in dressing rooms and hotel rooms. The new compositions are heard as they are tested by the Duke's complex instrument. If we really understood what jazz musicians are doing or "saying" through their music, if we appreciated what they are contributing to the art and culture of the world, if we accepted the contributions of this basic American music, we would subsidize a man such as Ellington as a national treasure.

INFLUENCES ON THE JAZZ MUSICIAN

The jazz musician is an individualist, a highly creative individualist, although he borrows and learns from all sources. For example, Indian musicians Ali Akbar Khan and Ravi Shankar have influenced jazz tremendously in recent years. The works of Bach, Bartok, Stravinsky, and some recent European composers have had varying influences on jazz. This is largely because the great jazz musicians, free of academic restrictions and following their creative instincts, go where their ears lead them and listen to everything. Many jazz musicians are familiar with the broad canvas of the world's music, unlike classical musicians whose insularity usually excludes a knowledge of jazz. Being less restricted in his approach and response to music, and having sought a great variety of listening experiences, the jazz musician is freer to experiment and to bring new sounds and forms of expression into his performance. This has been generally true from the beginning of jazz. It is no accident, for example, that the saxophone, a bastard instrument which has not yet been assimilated into so-called serious music, has risen to such heights in jazz. The trumpet in jazz, ever since the rise of Louis Armstrong, has been used to do things that the trumpet is not supposed to be able to do. These "extensions" result in part from the freedom of the jazz musician and his need to explore his musical medium and to follow his ear.

Jazz has operated under a great handicap in America from the time of its beginning in the South. It is Negro music, and the Negro always has been treated as a second-class citizen. In Europe, jazz enjoyed an enthusiastic reception and was more generally appreciated long before it was recognized here because the European ear was not stopped by color. European composers today are working with advanced jazz sounds and jazz ideas, and musicians, such as John Lewis of the Modern Jazz Quartet, insist that the only truly imaginative and vital compositional music today is coming from Europe. Lewis also believes that American classical music will die unless it opens its ears and its performance to jazz. This is a radical idea, but there may be some truth in it. Jazz musicians can and do play in symphony orchestras, frequently in brass and reed sections and sometimes in other sections.

However, very few classically trained musicians are of any use at all in most jazz performances.

Lou Gottlieb, a jazz-oriented graduate of the University of California's music department, once wrote that when the first great American composer came he would be a jazz musician or at least a musician familiar with jazz. I would go quite a way beyond Gottlieb's conjecture. I think that the great American composers are already with us, that they are on the scene now and that they are represented in such jazz musicians as Duke Ellington, Miles Davis, Charles Parker, and Charles Mingus. The music these men produce is the music that lives throughout the modern world, and it carries the sense of the American people to the world. I also believe that it is the music that will last.

The great jazz artists have done what they have done with very little help, if any, from the established educational system. What they have accomplished is far superior to the products of the established educational apparatus. Most university music departments are producing performers and teachers whose compositions are written, played, and heard only by other music department graduates. Jazz has moved the center of gravity in music outside the academy completely.

It is challenging to contemplate what might be the result of some active, planned effort to encourage, rather than to discourage, the musically creative youth in our society. It is of interest to speculate what might be the result if "jazz education" were brought within the walls of our better high schools and colleges. It may be explosive to reconsider and to design appropriate educational experiences for truly creative youth in any form of art or in any educational discipline.

NEVITT SANFORD

New Directions in Educating for Creativity

Is education for creativity different from good general education? There are arguments on both sides of this question, and our speakers at this conference were sensitive to both of them. Giannini made the case for special schools for talented people. He described a kind of education quite different from that which prevails in American colleges. Heist and Snyder suggested that potentially creative students are rather special, present special educational problems, and might very well need a special kind of education. On the other hand, MacKinnon suggested that a good general education and education for creativity are not different. In considering what might be done for creative people or to help develop creativity, he proposed that students need a certain amount of structure in their learning experiences, that teachers should be good models, and that creative people should have broad experiences. He also thought that "creatives" should be taught how to use their culture in order to free, or to find expression for, their impulses. My reaction to MacKinnon's ideas would be to say, in the words of "the hungry little kids" in the Grapes of Wrath, "We'd like to have some, too."

In a recent paper on education for social responsibility I offered recommendations not unlike those of MacKinnon's in connection with education for creativity. I was delighted to hear from Heist that, drawing upon evidence from his research, a high proportion of creative young people turn out to be those who exhibit unusual social responsibility. I suggested that education for creativity has much in common with good education in general.

TRAINING VERSUS EDUCATION

The defense of this point depends on what we mean by education and what we mean by creativity. First, let me distinguish between education and training. Education is traditionally defined as bringing forth what is already present. But we do not suppose that everything that exists in a person at a given time was there at birth. Education builds upon what was there at the beginning, or at least previously, making as much of the individual as possible. The general object of education is to make people fully human, to develop their particular potentialities as fully as possible. This process makes them increasingly different from one another, for good education means individuation as well as individualization of process.

This is very different from training, as illustrated by Giannini, who described the latter as practice, practice, practice. In training programs, people become more alike, not so much in music as in science and the professions, in which persons must learn a common language and common techniques, as well as acquire and profess shared attitudes, values, and styles of work. We tend to become like everybody else in our professions, acquiring, particularly, those modes of operation that generally serve to advance our chosen fields. There is, of course, some interaction between educational and training procedures. Many young people, when they decide on a course of study, begin to define themselves in terms of their discipline. This is more like training but can be quite valuable developmentally, for it may supply a much-needed sense of self. In general, however, there is a certain amount of tension between the two kinds of procedures.

Most undergraduate teachers in our colleges today are interested in professionalizing their students. The teachers are interested in recruiting students as early as possible, encouraging them to concentrate in their own departments, and molding students very much in the image of the teachers. This smacks of training and tends to conflict with the objectives of a general education. Usually, I favor postponing training and devoting the undergraduate years to general education.

INFLUENCE OF EXPERIENCE

In discussing creativity, we should differentiate between actual creative behavior and creativity as a disposition of personality. Two of our earlier speakers seemed to suggest this in speaking of the creative persons and the potentially creative ones. Creative acts result in novel solutions to problems, new ways of posing problems or looking at problems, or finding new connections among things. To perform such acts, it is most essential that an individual have diverse experiences in his background, so that he has accumulated a wide range of mental images to be connected. Broad experiences nourish a creative disposition, which leads to, or lies behind, the regular performance of creative acts.

Creative behavior depends a great deal upon the situation in which a person works and upon the era in

situation in which a person works and upon the era in

which he lives. Many people who achieve great reputations for creativity are in large part simply lucky. They are living at times when society is ready for just those things they want to do. But others are extraordinarily unlucky, being too far ahead of their times or too offbeat. A psychologist who wanted to study race relations in 1950, for example, would have found it extremely difficult to enlist support for his project. At that time, nobody was contributing funds to research along these lines. After 1954, it became very fashionable, and people began to conduct a great deal of creative research on race relations.

Pinner, writing in The American College, made a distinction between a consensual discipline (existing by common consent) and a dissensual discipline (not generally understood or accepted by the public). He suggested that the kind of discipline is an important factor in determining the fate of the creative person. The role of a man who wants to be creative in a dissensual discipline, as in jazz, is very different from the role of a man who wants to be creative in physics, a discipline that almost everybody appreciates. We may be sure that different kinds of people are recruited to these two kinds of disciplines, and, quite possibly, different kinds of underlying dispositions lead to good work in them.

Also, concerning creative behavior, another conference or symposium should address the question of how to develop conditions under which people of recognized creativity can do good work. This may well partially answer the question of a proper environment for highly creative people. In a way, Heist confronted this issue when he asked what to do about the potentially creative people identified in his study. He suggested a need for a kind of environment in which these students could survive, flourish, and feel appreciated. One might ask what kind of environment would *we* prefer when we take it upon ourselves to do some creative or productive work? If we knew how to build a university department that was really favorable to productivity of its staff, we could apply the same principles to the construction of an environment for those special creative people Heist described.

The environment for creativity is one thing; the individual's disposition for it is something else. This disposition certainly includes talent, and I favor regarding talent chiefly as a product of native endowment, which is transmitted genetically. MacKinnon used the term creativity to refer to a cluster of traits. This cluster included independence of thinking, an element of rebelliousness, self-awareness, openness to experience, and openness to oneself. The existence of all these traits is probably necessary to exceptional creative performance.

It is quite natural that the tendency to impulse expression should have an important place in the potential for creativity, as Snyder pointed out. According to theory, some contact between a person's conscious ego and his unconscious processes is important in most kinds of creative work. If creative people have access to their inner selves and are able to express their more basic thoughts and feelings in their writing or artistic productions, then we should expect that their impulses find expression in other areas as well.

If the disposition to creativity embodies such traits as independence of thinking, self-awareness, openness to experience, and breadth of view, then we are talking about something that can be developed or at least encouraged in college. This is a point of great importance. These traits are strengthened, on the average, in college. As Snyder pointed out, for example, scores on Impulse Expression scales go up considerably during the college years. To a considerable extent, those characteristics which separate the more creative person from the less creative person are the same as those that separate college seniors from freshmen. He hoped, as would I, that the higher Impulse Expression scores would represent "controlled" expression, a manifestation of maturity in which it is possible for the individual to express his impulses with genuine freedom.

Thus, we have a great opportunity, even as late as college, to develop creative potential. This opportunity may vary from one field of work to another. It seems that creativity in literature or psychology or social science, is a rather different thing from creativity in music, art, mathematics, and, perhaps, in those natural sciences that depend so heavily on mathematics. Talent in the latter fields is displayed very early. Consider, for example, the case of a physicist who makes a great contribution at the age of 20. It is much harder for a psychologist to make such a contribution at that early age, for he needs to draw upon a wide range of experience. Whether his talent is expressed before or after practice, it does seem to require this wide experience.

A number of creative people in psychology have had quite extraordinary backgrounds. Tolman, for example, studied engineering and discovered psychology later. Freud was first a physiologist; he did very precise experimental work before he became a practicing physician, which later led him to become a psychoanalyst. He said that what he really would have liked to be was a philosopher. He loved speculative thought. The diversity of background that we find in Freud might be just the thing to supply the breadth and richness of experience that a person would need to make new connections among ideas. This is different from what is required for creative acts in mathematics or natural science.

Another point I want to make was suggested by what Webster said about creativity as self-fulfillment. We can think of creativity in this sense as something that everyone has. As Giannini mentioned, one can be creative even as a janitor. He put the accent on excellence of performance, with which I can agree. But I would accent also the individuality of performance, its style, or unique features of it, that which expresses some aspect of the individual himself. Everybody has, and needs to have developed, this kind of creativity.

IMPLICATIONS FOR EDUCATIONAL PROGRAMS

Education for creativity would seem to be much like good general education. But, a serious question concerns the training necessary to the performance of many tasks in our society. Can we afford to postpone training until the graduate years? When we think of a son, would we be willing to let everything remain open-ended until he entered graduate school to begin his training, or would we become anxious about his career while he was still in high school? For example, if he were thinking about becoming a physicist, would we, like his teachers, want him to take plenty of mathematics in high school so that he would be well prepared for all the courses said to depend upon it?

Concerning training, Giannini said that if we want to develop musical talent we must start people young, and that they must work over a long period of time. Physicists often try to persuade us that with physics it is the same. Some chemists would like to identify talent for chemistry even in elementary school children and start grooming them for chemistry then and there. We know that there is much pressure on young persons to make their choice for chemistry while in high school so that they can be sure to have those experiences which are considered fundamental to later development in this field. Why not schools for chemists, then, schools such as the one Giannini has started for students in the arts? There are some who would favor this idea, I am quite sure. But some of us would resist, believing that chemists should be educated people first of all and that the training should come thereafter.

However, Gleason holds that almost all great creative musicians in jazz attained their virtuosity without benefit of formal education in music, but he also spoke of the countless hours, days, and years given to practice, listening to others and working with others. It seems to be still an open question whether there are ways in which the creative person in modern jazz might develop other than by learning first-hand by experience and through the school of hard knocks. Maybe this "school" could be carefully reconstructed, to eliminate some of its more painful features, and then institutionalized.

We should be very cautious about stereotyping young people and launching them too early on specialized educational paths. Heist went to considerable length to show that there is a certain tenuousness about the identification of creative people. Even if they do have much in common and can be differentiated from other young people, quite possibly many potentially creative young people in college have not yet shown any signs of creativity. If we cannot be sure which people should have special attention in college, then the safest course is to see to it that everybody in college receives as good an education as we have to offer and ample opportunities to develop any existing potential.

I do not know how the issue is to be resolved. There is a fundamental value conflict here: between the need to produce people who can make specific kinds of contributions to society and the need to develop individuals as fully as possible. Perhaps all we can do is to recognize these conflicting values and try to arrange the educational experience so that if one is realized fully it will be at as little expense to the other as possible.

EDUCATING FOR CREATIVITY--A NEW MODEL

In considering this kind of general education, I want to use a theoretical model. Other people have suggested quite different models, not always made explicit. One dominant model in American higher education was suggested by a lawyer who wrote me a very critical letter about our book, The American College. Apparently a conservative man, he said that this rather dull-looking volume was actually a revolutionary document in that it sought to implement the "liberal bias." He wished, however, to give us credit for one thing. He said, "I used to think that education was to learning what food was to eating. I see now that that is not so." The acceptance of this model, that education is to learning as food is to eating, is widespread in the United States, although it is not always articulated.

Some models widely used today derive from behavioristic psychology. According to the most common one, the individual is conceived of as an aggregate of stimulus-response connections. It is supposed that a stimulus worms its way into the organism as into a piece of cheese, going directly to its target without disturbing anything in the surrounding areas, and then a response emerges with the same predictable neatness.

This accent on specificity, when carried over into education, has led to fragmentation of curriculum. When education is conceived of as a matter of teaching facts, then the "explosion of knowledge" means simply that more facts need to be taught; and courses and departments proliferate. Since we have few means for integrating knowledge, or perhaps do not even believe in it, and concepts for organically relating the individual's dispositions are not accepted, then there is nothing left but to find more and more efficient means for teaching facts. Students who adapt themselves to this system begin to conceive of themselves as fragmented and engage in the business of fragmenting others.

The increasing use of technological aids to education (efficient means for teaching facts) was made possible by the existence of the behavioristic model. The widespread acceptance and use of these aids tend to sustain the model. Also, the aids cost money, and where the investment is heavy there is strong pressure to use them maximally. Such aids might be introduced with the idea of freeing the teacher for more important work. The fact that many teachers cannot think of anything more important than teaching facts--the facts of their own disciplines, of course--serves to reinforce the behavioristic model.

The present rebellion against the narrowly cognitive emphasis in education should not surprise us. Twelve or fourteen years of emotionally barren and often meaningless fact-grubbing (the length of time college students have spent in school) seem well calculated to leave a person starved for feelings and for symbols. One form the rebellion has taken is the LSD movement. In part, advocates of LSD seem to want to restore instantly what has been left out of 14 or so years of education. Yet, the idea that a drug can do this is of a piece with behavioristically based education, in that it assumes the same kind of emptiness in the person. To be sure, emotions can be released and imagery induced by various chemical and mechanical means. But the range and quality of emotions and imagery are enhanced and developed through broad experience and a challenging education.

The model I want to present is not original. The Greeks invented it, and it was further elaborated by

Freud and others. All I can claim is that I did not think to apply it to education until after I had had an opportunity to make some systematic observations of college students. Since then, it seems that nothing else will do.

According to this model, the individual is conceived of as a whole; all of his functions--cognition, feeling, emotion, and action--are mutually related. Development in any one function is accompanied by development in others. The development of the person, like the development of any living thing, is in the direction of greater complexity. First of all, development includes expansion, that is, the enlargement of parts and the adding of more parts, as capacities and sensibilities. The parts become increasingly differentiated, serving different functions according to the complex demands of the environment. And as expansion and differentiation increase, the individual must integrate them. The integration of what has first been differentiated is what we may describe as developing complexity.

Development occurs in response to challenge. When the individual encounters situations he cannot manage with his existing repertoire of responses, he generates new responses. If these are successful, they are retained and integrated with the rest of the personality. However, people insist on doing things as they always have unless they meet situations that require new kinds of adaptation. Children, of course, are constantly confronted with challenging situations and so they learn very rapidly. College students present difficulties to the educator because they already have learned many more or less suitable adaptive strategies, so it is difficult to challenge them to generate new behavior patterns.

We may note in college students a kind of tension between the disposition to maintain such behavioral structures as they have and the disposition to expand, develop new responses, and discover themselves and the world. Students constantly try to convince themselves that their current ways of organizing experiences will do, that they can relax and learn only what is in keeping with this existing structure.

Children and young people often maintain their existing behavioral structure by repressing perceptions of experiences that challenge the structure. To have a sense of wholeness, the child, when confronted with difficult problems, may deny or make unconscious certain aspects of himself. He must act as if his conflicts did not exist. He, thus, attains a sense of structure, although large areas of himself are not taken into account. Every freshman presents, in some degree, a picture of this sort. Much of him is not included within the conscious self with which he faces the world. Thus, professors must see it as their particular duty to break down such structures so that students will develop new structures on a higher level of complexity.

How can the more or less repressed students be opened up to learn things that will not simply confirm or support the structure that they already have? Can this be done quickly and efficiently? Is there an approach similar to psychotherapy to use to open students to new experiences and, thus, enable them to modify themselves in ways that will be valuable to them?

We do have educational procedures, or we can conceive of procedures, that will serve to open people over time. For example, teaching literature in a way that invites understanding of people, without judging them, can open students to new experiences. We must recognize, however, that opening up is not all that is needed. Students also need education that gives familiarity with the world of facts.

Let's consider the progressive nature of development. The essential notion here is that development builds on what has gone before. We need to know much more than we do about the timing of events in ideal development. There seems to be a time for discipline and a time for relaxation of discipline. There is an ideal time, quite possibly, for learning language or learning the basic structure of music; if this time is missed, fundamental things may be learned later only with great difficulty, if at all. Personality development might best proceed at a fairly deliberate pace. The fact that the richness of any experience depends upon the context of the individual's past experiences is a basis for objection to early marriage. A 16-year-old girl could not possibly derive the same meaning from motherhood as could a 21-year-old woman. In general, and within limits, the more complex the existing structure is at the time the crucial experiences of life occur the better off is the developing individual.

Many of the potentially creative people described by Heist were exposed to too much, too early, in my view. There is a certain precociousness about many of them. Many experiences which you and I postponed until graduate school are already old hat for these young people. The result seems to be that the expansion of their impulse lives seems to have run ahead of the structuring process. They already bear the stigmata of our mass culture by the time they arrive at college. When students enter graduate school in psychology today, they already have been exposed to most of the psychology the graduate faculty thinks they are supposed to teach. The trouble is that the students are not really dry behind the ears. The meaning of much that they studied has been lost on them, and they are being denied the excitement of discussing ideas at a time when there is readiness for them.

Some psychologists seem to argue that anything can be learned by anybody at any time and that the earlier in life we get on with it the better. More and more of the traditional college curriculum is being taught in high school and the high school curriculum in elementary school; the first thing we know, everybody will know everything but nobody will understand anything.

There are important individual differences in rates of development. We may take some heart from this consideration. Many young people may find themselves, some while they are still in college, and they may look back on their present state as a manifestation of growing pains. In the colleges today, students' confusion about what to do with themselves is lasting longer and longer. Katz recently called attention to the fact that this kind of confusion or uncertainty is quite common among Stanford senior men. I think this may be quite general. The period of differentiation and exposure to varieties of experience is lasting longer now. If we insist on a system that eliminates or refuses admission to all who have not found themselves at the right time, then, of course, we are lost. There is probably more tolerance for taking time to find oneself than there was during the 1950's when young people were pressured to hurry up and decide what to do. Unless we have the proper perspective, we can become anxious about seniors who are still up in the air about what to do with themselves. But if we consider the times in which we live and have the right kind of developmental perspective, we need not be driven to panic. Knowing some of these young people, I have confidence that most will find themselves--if somebody will have faith in them. When we adopt a developmental perspective we may see that people who take a long time to get organized are often the very ones who go far in the long run.

Consideration of potentially creative students is, of course, one basis for criticism of what the colleges have been doing. If they are failing these young people to the extraordinary degree indicated by Heist and Snyder, one hates to think of the fate of other students. If there was a suggestion in what was said about the potentially creative students that the colleges were neglecting them because other students were getting so much attention, I am afraid this is not so. The other students are probably even more seriously neglected than the potentially creative ones. Very little is happening to the great rank and file, beyond being given some increased familiarity with certain aspects of our culture.

NEW DIRECTIONS IN EDUCATION

The question, then, is: What should we do? Fundamental to reform in the colleges is a change of attitude on the part of the people who staff them. The faculty must conceive of themselves as educators and take an interest in education. We cannot make much progress unless many faculty members broaden and deepen their understanding of students. Unless they become curious, eager to know some students, and are willing to do something for them, nothing much is going to happen. Such interest and concern is foreign to most college teachers; most are unable to discuss education intelligently and are not interested in doing so. It is still true, or at least it was until the student protest at Berkeley, that most university teachers regarded it as dangerous to their careers to show any genuine interest in students. Such interest would be viewed in the disciplines as putting students ahead of subjects, or an attempt to turn the campus into a therapeutic community. It does seem that a faculty member ought to be able to recognize the sort of difficulty encountered by the young man that Snyder described, the one who had to derive his own formulae because he could not accept them from authorities. It is a shameful thing that psychologists have to be called on to diagnose educational problems. A college teacher should be able to identify an education problem, know how to find out the difficulty, and to have some idea of a remedy, without sending students off to the psychiatrist.

The Muscatine Report is a great achievement, looking at it in historical perspective. Ten years ago, one could not have talked about students as the report does and had an audience in academic circles.

Many of us just now are learning to discuss educational problems, and the report, in encouraging us, has made a great contribution. Having said this, I must add that in my view the report does not go far enough. It flirts with the developmental point of view, but it does not really marry itself to it. The authors are willing to recognize that students are human beings who, like everybody else, need to be shown a few acts of kindness occasionally. However, I'm afraid that the authors are really not convinced that learning is a human process integral with all the other functions of the whole person. Learning of any consequence involves a change in a person. It is a highly personal thing. It is one thing to be kind to the students you intend to put through the mechanical business of learning course content by rote, but something else to look on them as people who learn the way the rest of us do, that is, painfully, in response to challenge, and with all of our selves.

If we look at education seriously as individual development, then all kinds of possibilities open. It is in neglecting possibilities that the report falls short. This is, of course, quite understandable. It is one thing to design a new institution on the basis of what we now know about education, but something very different to modify according to plan an enormous and complicated structure such as the University of California. It is possible to see in the report that recommendations are made with a view to what the traffic will bear. The authors show impressive wisdom in making this judgment.

The report presents the fundamental idea of education as a developmental process. Effective education always involves changes in the person toward more complex levels of behavior or development. When education is viewed this way, we begin to deemphasize content, realizing that different contents may be used to achieve the same end. This is the beginning of educational reform. It is not how much students are offered in the way of courses and syllabi that matters; it is the quality of educational experiences they have. When we look at it this way, it becomes clear that the "explosion in knowledge" has no great message for educators. We never can teach students more than fragments of the existing knowledge, so we should make our choices on the basis of what we believe the student needs to develop him as a person. The report admits that quite different kinds of content might serve educational purposes equally well. If the report had only taken the next step and directly challenged the departmental structure, at least as it determines the curriculum for freshmen and sophomores, we would be well on the way to educational reform.

As matters stand, the really valuable contributions to reform must be added on to the existing program and structure. Last fall, Stanford University introduced freshman seminars, which already have become one of the most generally applauded features of Stanford education. It became possible because of a $50,000 gift that could be used in any way that an *ad hoc* committee thought favorable to creativity. But would departments at Stanford sacrifice any of their offerings so that one of their faculty members could give a seminar? Not by a long shot. Nor would this happen at any other university today, I am afraid. Faculty members are perfectly willing to talk about exciting educational innovations--so long as they do not threaten the departments. And of course there is nobody to tell the departments what to do. Until this changes, we will not have reform in depth at Berkeley or at any other institution of higher learning. We cannot expect the faculty to teach everything they must teach for their departments during the day and then in their spare time and out of the goodness of their hearts give a freshman seminar.

If the attitudes that I advocate were adopted, it would not be necessary for the report to be so fainthearted in its recommendations about grading. It is not at all revolutionary today to conceive of all grading on the pass-fail basis, yet the report restricts itself to giving the students one course that can be taken on a pass-fail basis. This is a compromise, pure and simple, but I have no doubt this is as far as the faculty will go at this particular time. It would not be surprising if, within the next year, distinguished undergraduate institutions gave all their courses on a pass-fail basis, recognizing that what students need for their education is not grades of the usual sort, but criticism of their work.

Recently, a young woman graduate of a famous Eastern college described her most valuable educational experiences in college. One was in a freshman seminar when she discovered that the teacher regarded her work as worth something. This helped her identify with the whole educational enterprise. She went along swimmingly, receiving only A's until her senior year. As a senior, she wrote a paper in an offhand way, still expecting to get an A. When she received a C, she complained to her teacher with a display of arrogance. He spent an hour discussing the first page, and half an hour on the second. She said that on leaving she felt lucky not to have been given an F. At a certain time, a student needs above all to be given a sense of worth. At another time, what that student needs most is to be brought down a peg. In both cases, criticism of a particular work is what is most valuable.

It is not the frequency of student-faculty encounters that matters; it is rather their quality. A show of personal interest at a time when the student is in special need of it or a show of firmness when it is clear to the student that this is in his interest may change a student's life.

It is well to remember, too, that most undergraduates are not looking for intimate relationships with faculty. We are not likely to be overwhelmed by students seeking intimacy. There is no call for us to have relationships of equality and good fellowship with students, and there is little to be gained from our seeking students out in order to meet our needs--for popularity, for freedom from guilt, and the like. What is called for is an arrangement of academic life that will make it possible for students and faculty to reveal themselves to each other, so that the truly beneficial brief encounters have a chance to flower into a relationship neither sentimental nor clinical, but which embodies a decent concern for the student as a human being for whose development the faculty has some responsibility.

Asking a college teacher to be aware of the changing needs of students, and to be on hand to meet the needs of particular students, is asking a great deal, of course. This is individual education, available at a few very expensive colleges. Yet we need not be discouraged about the possibilities of realizing some of the benefits of that system in large institutions. However, increasing knowledge of personality development in students and of the meaning of student-faculty relationships may become increasingly a part of faculty culture in large institutions. This knowledge may influence the day-to-day behavior of the faculty member. Much will depend on our ability to produce literature about students that is sufficiently interesting and well written so that the faculty member can ignore it only with difficulty.

Now comes my final point about undergraduate education in general. If we can free college teachers from their preoccupation with covering content, free undergraduate education from its domination by the departments, and free all concerned from the tyranny of grades we can get back to a fundamental principle of pedagogy: helping students to go from their own experiences, from the examination of empirical phenomena, to the generation of concepts.

In many areas of inquiry, such as philosophy, literature, history, and political science, this means using original sources, instead of subjecting students to massive conceptual baggage concocted by professors who need to write textbooks or prepare lectures. I know of an advanced course in social thought in which the students have to learn various interpretations of Hobbes contributed by the teacher and his friends and colleagues--prolific writers all--but have no chance to read Hobbes himself. Here is grim testimony that the typical undergraduate course has been structured for the faculty rather than for students. Teachers of the physical and biological sciences have, of course, used the laboratory to tie concepts to observable phenomena, but the neglect of this principle in the social sciences is distressing. The study of social science ought to begin, it seems to me, in the field, and students ought to be discouraged from trafficking in concepts that they cannot connect with observations. I was delighted to note that the Muscatine Report recommends that a problem-centered curriculum, for example, a curriculum organized around urban problems, be tried with freshmen and sophomores. This seems elementary, yet the principle it embodies is so badly neglected today that even a small reform along the lines advocated could be labeled a creative approach to education for creativity. One could probably get a foundation grant to support it!

Students, even some fairly rebellious ones, are usually grateful for small favors. Often, a little understanding and faith will go a long way. At Stanford, after the Berkeley revolt, the deans spent a great deal of time listening to students, singly and in delegations, and a few reforms in student life and in the academic realm have been instituted. I won't say these measures avoided overt rebellion, for probably none was in the offing anyway, but they did help to create a good climate for discussion. The amount and the high level of discussion of education in the Stanford Daily during the past year has been unique in my experience. I suspect that at least some of our potentially creative students have had their morale boosted.

Listening to students and being concerned about them does not mean giving them what they say they want. We can expect them to be inconsistent and even contradictory in expressing their wants; they are in a poor position to know what they need. Rebelling students have been accused of having no program, as if they could develop an educational philosophy and educational procedures where their elders have failed. It is up to educators to understand students, to know what they need and how their needs might be met. What students say they want may be one basis for inferring their needs, but it can never be the only basis. The educator must know about students in general, he must have a guiding philosophy that tells him what they ought to become, and he should have access to a theory of personality development that can guide his selection of instrumentalities.

There is no denying that some creative students can be difficult. Some are self-destructive and deliberately provocative. As suggested earlier, some have experienced premature gratification of impulses and are in rather desperate need of external control--which they would rather die than accept. Some can accept leadership from adults of proven worth who share their own convictions, but others reject the whole idea of leadership, even the idea of organized social action. But it is not helpful to suggest that individual psychopathology is at work here, and it would be a grave error to indicate to these students that on this account their arguments do not deserve attention on their merits. Some pretty far-out students have called attention to truths that should have been obvious. I suspect that in the future, again, some extreme deviants will be required to encourage the rank and file to break the bonds of bland conformity.

Student protest movements fundamentally reflect changed times. They are a warning that the colleges and universities must change. No longer are we pressed to hurry and produce the manpower to keep the productive machinery of the nation going; rather, we have the task, and the opportunity, to reexamine the nation's purposes. This is what our students want us to do, and this is what they need. We have a chance to rediscover, to restore, and to advance the values of the liberal university. To do this would be to strike a powerful blow for creativity.

Symposium

Panel Moderator: James Trent, project director, Center for Research and Development in Higher Education.

Panel Members: Donald MacKinnon, director, Institute for Personality Assessment and Research; Vittorio Giannini, president, North Carolina School of the Arts; Harold Webster, professor of psychology, Brooklyn College; and Ralph Gleason, columnist for the San Francisco Chronicle.

TRENT: In part, this is a test of creativity--for me and others on this panel--since we are to react to the ideas and criticisms expressed in this conference. After interacting on the panel for awhile, we also will respond to questions from the audience.

When I think back to my graduate student days, I recall that the scholars with the greatest creative potential could not put up with the regimentation of graduate school; many extraordinary people tended to leave. From those who remained, however, there was a lesson to be learned: If you do good research you very likely will raise more questions than you answer. In this sense, this has been a good conference. I don't know that the speakers have answered many questions, but they have raised many good ones. They also have highlighted some unresolved problems in college education.

I think, before we start a general discussion here, we ought to reflect briefly on certain ideas presented in the conference. We have heard something about the sources or bases of creativity, although the conference was not directed to that topic. We have been told about autonomous parents and autonomous, permissive mothers, who are able, at the same time, to promote a certain amount of self-discipline among their children. We have frequently heard that the basis for creativity is laid, at least in part, in the very early environment. However, we are not sure at this point when the most influential experiences occur or exactly what the appropriate environment is. For example, is it the freedom and liberality of a home or one with well-established standards where parents serve as effective models?

We have learned something about the specific traits of creativity even though the speakers did not concern themselves with a comprehensive definition of the term. The "creative" is independent and innovative, we have been told. He plays with ideas and concepts. He has a highly developed sense of the theoretical and the esthetic. He is open to experience and is spontaneous, flexible, and complex in outlook. He is a rebel, but we hope a rebel with a cause. In general, he is reasonably intelligent, although intelligence is not directly related to creativity itself. He is not necessarily the greatest achiever in terms of grade point average. When considered in numerical terms, he is underrepresented in applied and professional fields of study. But we also were made aware that there are "creatives" of different types.

Most of the speakers focused on the question, How does the creative student fare in the academic environment? And we learned that, whether at a highly selective liberal arts college or at a science institute, he is too often a transient, moving from one school to another or withdrawing from college. In his flight from the system, the creative student often may be forsaking the field in which he might well belong and in which he could very well succeed.

Another focus of the conference was on the ways we foster creativity. Questions were asked about the programs which encourage or permit creativity to be developed. The speakers also inquired about the kinds of models that lead youngsters to creative thinking and the kinds of interests which would be best, to stimulate and encourage creative behavior. It was also urged that we learn to differentiate among types of creativity and that we attempt to cultivate these discerningly.

The methodology for assessing the nature and nurture of creativity, I think, leads us to various questions and numerous problems. With one or two exceptions, the speakers discussed only indirectly the problem of the validity of psychological measures and indicated how we have chiefly relied upon rankings and ratings rather than productivity to identify students with creative potential. Valid as the ratings may be, they generate a host of problems. Because of such problems we might further ask whether we really have identified the truly creative person, at least in colleges and universities.

Finally, I think we have to face a problem of ethics and ask ourselves, as did one member of the audience: To what extent are we entitled to foster creativity? To what extent are we privileged to design for creative students an environment that reflects our values--values which initially may be alien to them? Perhaps some panel members will respond to these questions.

I will open our discussion at this time by posing these two questions: To what extent do you think creative behavior depends on early environment? And, how does an early foundation relate to efforts to foster creativity during the college years?

GIANNINI: I think creativity at any point in life is part of the individual, his past, and his inheritance. The latter isn't always apparent; many talented performers and composers have come from families in which no artistic talent is manifest in the parents. Talent can appear anyplace, in any family, in any class of society. If the talented person happens to be in an early environment which nourishes his talent, he is fortunate. His talent will come to the attention of his parents, or so we would hope, and if the parents are perceptive and value it, they will take steps to provide for the development of this talent. As educators, however, we cannot rely on the parents; we have a responsibility to our youth and we must create the institutions which offer young people the opportunity to develop their talents.

If parents cannot provide essential opportunities, even though they may recognize the talent, exposure to the arts has often been the stimulus which helps develop talent in a child. I advocate as much exposure to the arts as possible and from the earliest time a child can learn to respond even though he may not understand. But, I feel confident that if the child has talent, he will be stimulated by these encounters. We must not only provide the talented child with stimulation and an opportunity at very early periods, but we should also educate him as a total human being, in the early years as well as later in high school and college. We have failed to provide this crucial sequence of total educational opportunities.

TRENT: One conference speaker has implied that much of our education system is too formalized and stifling, and that we actually squelch creativity. If the creative student is a spontaneous person, how can we teach to encourage creative expression, whatever the level of initial talent, if everything in our high schools and colleges is scheduled and routinized?

WEBSTER: Well, just one brief remark about this. I think that we can be critical of the colleges, but we must remember that the colleges are an expression of our social order. The colleges have become what they are because of the problems in the general society, and, of late, the attention directed to the college situation is partly a result of the broader cultural social changes that are occurring. I think that many college students have been involved in protest activities because they want things changed. It appears that they are critics of the social order as much as they are of the colleges. What is more, I think that it is true that many kinds of creative talent will not be developed within the formal structure of modern higher education. The so-called nonstudents are indicating this; they don't like the system and frequently leave. We needn't place the blame or burden of guilt on colleges or college administrators or on politicians; we can place it squarely upon ourselves as members of this society.

GIANNINI: I tend to lose patience with the people who say, "I don't like the system or the society." It is easy to give destructive criticism, but, as adults, we only have the right to criticize something if we then suggest improvements. Some students don't like some things in their colleges; there will always be people who object to anything that interferes with their particular way of doing things. Yet a certain amount of discipline is necessary or basic to everything we learn. I do agree that we have to change; we should improve our systems continually. We should study the changing society, the changing world, and try to the best of our ability to accommodate these changes.

I would like to see a kind of artistic and academic education in which we would educate all for a better world. But the difficulties of implementation are enormous. We first have to convince many of the teachers; secondly, we have to convince the boards of education, and so on.

With respect to the difficulties, we must try, for example, continually to improve our curricula, to broaden their scope rather than to proliferate specialties. I think we have a tendency simply to add to existing programs. We must reexamine present methods and programs and often eliminate the unworthy.

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Also, we must consider the differences that exist among human beings. We will never create a perfect system, nor a single program of education that is right for everybody. Hence, as the researchers pointed out, it is of the utmost importance to have teachers who will study their students, and give them the kind of teaching, direction, or criticism that seems most likely to help the growth of the individual students. The particular personality and motivation of each student is important, as several speakers suggested. And it is crucial that teachers develop their sensitivity to these differences among students.

MacKINNON: I agree very much with the thesis that the best education for the potentially creative students is probably equivalent to the best education we plan for all students. But I think that we must face the fact that, even if we could envision and realize the best of all systems in the way of educational organization and style of teaching, it would not appeal to all students. As several stated in their papers, we have to realize that some would not be educable, not in the way our objectives suggest.

While we have become properly concerned about students who drop out or those who become alienated, I think we have to recognize that there will be times, for some students, when it is right and appropriate that they should drop out. I don't always feel that dropouts are people we should bemoan or be overly concerned about. One of the speakers indicated in his talk that many creatives are perhaps better off leaving college. It seems to me that many individuals may need time away from school, and to try to force them to continue in the educational system would be most unfortunate. Some people have experiences outside the college context which encourage the growth Sanford mentioned. This may seem as something of a paradox, if we are trying to design an educational utopia.

If we could identify most of the highly creative individuals and could agree on the ideal experiences to provide in college to further the development and expression of creative dispositions, many of those identified, by their very nature, would object to what was proposed as an ideal program. The creative person is an individual, and many of them, through their work or art, hold up mirrors to society. A great deal of the student criticism is directed at the society, by way of the school, as one or two of the speakers suggested.

We ought to recognize the variety of human beings and be sensitive to the variety of experiences which will be most appropriate and valuable for them. We ought to recognize that there is no single way to nurture the creative potential of all individuals, nor any easy way to educate those with the greatest potential.

GLEASON: If I may return to something said earlier, I'm not tired of hearing people tell me what's wrong with society or what's wrong with the educational system. And I certainly don't think that as a qualification for telling us what's wrong, a critic has to present a five-year program for educational reform. Approaching the problem from that point of view simply reinforces the assumption of many students that they can't trust anybody over 30 or even talk to him.

I also agree that we cannot dream up an apparatus or system that is going to produce creative persons, nor can we do very much more than create an environment in which they can expand. What I would propose for the educational system (from which I was a dropout) is that it get out of the way of creative individuals. It should not tell them what they must do or the ways in which they must do it. It should provide them with the opportunity and the place and platform to explore their own creativity or aid them by providing proper tools when this is possible.

We talked about discipline as being essential in one sense to the education of young people. You can't listen to Louie Armstrong, Dizzy Gillespie, and Miles

Davis play and hear their virtuosity without realizing that it is a result of hours and hours of discipline. But, this is self-initiated self-discipline. Some of the jazz greats have had to lock themselves in a room and practice for days. Sonny Rollins, a great saxophone player, told me that he never goes to sleep without putting a pencil, flashlight, and scratch pad by his bed. In this way, when he wakes up with ideas concerning music, he can write them down and pursue them the next day. No good artist is without discipline and control of his time. We don't have to tell him about it and probably cannot train him to do it; if he has the desire or is really going to be an artist, he is going to understand or acquire a need for discipline.

I feel that the main problem of educating creative people, at least in the areas with which I am familiar, is that by the time they reach college age, they are faced with an enormous, rigid structure and organization. This gross entity is not only buildings, people, regulations, and forms, but an overall attitude of many who maintain the institution, which prevents creative people from getting to those things or experiences which are most important to them. Possibly this corporate attitude reflects the society, and, if so, we might conclude that the results demonstrate wasteful societal tendencies.

The structure or system makes creative people spend a lot of time which, at that point in their careers, is not of any use or interest to them whatsoever. Most jazz musicians who become the virtuosos start at an early age and spend eight or ten years practicing and playing before they ever get around to reading a novel. Only after they have mastered an instrument and have something to "say" on it do they begin to expand in other directions.

TRENT: Several of us have referred to the appropriate or right time for encouraging creativity and we seem to imply that this is or should be fairly early. How do we recognize creative potential among youngsters, so that it can be encouraged at the right time? If there is a way of recognizing it, especially in the early years, won't the means of identification vary according to the type of creativity? I sense that there is one kind of creative expression on the part of certain kinds of musicians; I sense another form of creativity in the productive research scientist. I have been wondering whether we have been talking about the same kinds of creativity.

MacKINNON: No doubt there are different types and forms of creativity. Our own investigations of several groups have shown this. If you note the way in which individuals evaluate their own experiences, there is clear evidence that artists, writers, and poets have a preference for feeling judgment. On the other hand, research scientists and engineers clearly prefer analytical thinking. But it is not quite as simple as this.

The majority of engineers and research scientists will show a preference for thinking, but those who are creative in these fields will show more feeling in their development and behavior than those who are less creative. In other words, they tend to develop "opposites" in their thinking or personality makeup; they tolerate the tendencies of opposites in themselves and, in this way, fully develop more complex dispositions, more styles of cognition, and openness in attitudes.

Gough examined scientists in industry and, through a very elaborate assessment program and intense analysis, he investigated their styles as research scientists. His findings indicated no less than eight different styles or ways of behaving as a research scientist. Clearly, these and other data show that differences exist not only among creative persons in different fields but also among persons within the same fields.

GIANNINI: I am surprised that there were only eight different styles.

MacKINNON: Well, this finding is a function of the means of assessment and the accuracy of the methods. Quite naturally, there may well be other styles not revealed through this research.

WEBSTER: If creative people are this varied and complex, then there is some merit in the suggestion that the least we can do in the educational system is to get out of their way and permit them to express or develop all of these different styles.

GIANNINI: I would like to pursue these points a little further. Doesn't the creative impulse manifest itself in different ways, not only according to the person's discipline but also as a product of his particular personality? Creativity manifests itself at different life stages. For example, although talent and creative evidence very often appear early in the arts, any number of artists have bloomed quite late in music. Guiseppi Verdi, one of the musical giants of the last century, developed slowly. As a matter of fact, at 19, when he sought admission to the Conservatory at the Imperial City of Milan, he was turned down. Not only was he not admitted, but the judges who examined him felt so strongly that Verdi had very little chance in music that they wrote him a letter, advising him to choose another career. But, he chose music anyway and wrote many tremendous masterpieces. This man started late, but unlike most great musicians or composers, his creative genius also continued. Very often the masterpieces of older composers are fine examples of great craftsmanship, showing great knowledge but lacking youthful inspiration. However, Verdi's greatest works, impressive masterpieces of know-how and experience and full of inspiration and vitality, were written when he was over 80.

Now, on the other hand, Mozart was very precocious and reached great heights just before he died as a very young man. There are obviously great variations. I don't think we can be dogmatic about the timing of creative performance, even within a discipline or art form.

But, when talent is first recognized, it should be nurtured, in whatever way helps the individual. And if the school blocks expression of his creativity, he shouldn't go to school.

GLEASON: One of the jazz greats, Dave Brubeck, originally prepared for future studies in veterinary medicine at College of the Pacific. He soon discovered that he was spending all his time playing the piano. His mother was a piano teacher, and he had come from a family of musicians. He considered a transfer from the preveterinary program to the music department, but the man with whom he discussed the move told him to go back to veterinary medicine. As was the case with Verdi, the soundness of that advice has been contradicted in grandiose style.

I wonder if those who have engaged in research on creative people have found any evidence that persons who have been supremely successful in any creative area, such as science or painting, have attained their success by following the book or being told what to do. Aren't the eminent people often those who have done things in rather unconventional ways? Even J. Paul Getty, in his celebrated Playboy memoirs, talks about all the things he did that they told him not to do, and he believes that's why he is successful. It seems to me that we can't make rules for this sort of thing or give directions to the really talented and creative.

GIANNINI: I would go a step further. I believe that you teach yourself and, although a teacher might show you the way, you really learn the most by examining yourself, responding to your own needs, and studying according to your own dictates. A creative person often must do what he is told. He can be taught some things and guided, but only to a point. At times it may be true that a person develops to a high degree by doing that very thing which would be poison to someone else.

MacKINNON: I can only agree. My answer would be that those who are really creative obviously have thrown the book away in the sense that they have come up with innovations that nobody else has discovered.

WEBSTER: This presents quite a problem for teachers because, as you and your colleagues have shown over the years, creative people are frequently not very pleasant to have around. Teachers do not always welcome original and unexpected responses in class. Consequently, there might be some good reasons for training teachers to be more cognizant and tolerant of the innovative, imaginative youngsters. If we could retrain teachers to develop their perception and understanding of students, perhaps the exceptional student would be more inclined to remain in school.

On the other hand, I am somewhat skeptical of identifying a creative person before he has produced some kind of product. But, perhaps we should redefine what we mean by a product. I hasten to add that I have recently returned from India where a product might be self-actualization or self-realization, an intangible personal development to a higher level. In India, people say they can recognize this development and distinguish between a real holy man and some imposter. Men who have lived in India all their lives say that they believe there are types of creative self-realization, that is, re-creations of the self, that do not involve material products such as we respect in this culture. At the same time, I noticed that the people most closely connected with a tangible form of art in India assumed that it was not difficult to identify creative people by their material products. But, we were speaking to the question: How can we identify them in our own culture? I don't know whether we can identify them in this society before they produce something, that is, with any degree of certainty.

GIANNINI: To return to your first point, I can't agree that creative people are sometimes very troublesome in class and that they tend to be difficult. In my personal experience, the innovative students made my classes the most interesting. If someone raises a question that prods the teacher to think a little bit, this is good for the teacher. Without the creative people, I'd be bored to tears.

TRENT: With respect to the points raised by the last two speakers, are we guilty of what Don Jackson has called a double bind? Are we asking the same individual to go in two directions at once by saying, on the one hand, we want you to be a good, mentally healthy, well-behaving citizen and, on the other hand, we want you to be very open and flexible and prone to think in ways that are unique and original?

MacKINNON: It does not seem to me that we are putting the individual in a bind--not the creative individual. We may be inducing tensions between two opposite dispositions or tendencies. But, if one thing characterizes the highly creative individual, it is his greater capacity to tolerate conflicting values and dispositions within himself, while effecting some kind of integration.

Otto Rank conceptualizes two different types of men. The first he calls the adaptive type, a normal, average man who experiences no strong drive for individualization, experiences no conflicts, and conforms to the social norms. He is largely at one with society, feels comfortable in it, and yet may be a very productive and effective individual. The thing which characterizes him is that he places great emphasis upon adaptiveness to the situation in the society in which he was born.

The other type Rank calls neurotic or conflicted. I would be more inclined, incidentally, to describe this type as conflicted. This individual strikes out on his own and attempts to formulate his own goals, ideals, and moral and ethical standards. These are generally different from those which are socially sanctioned or seen as conventional. The conflicted person develops new attitudes toward himself and toward the world around him. Within him are possibilities of development which do not exist in the adaptive individual. However, if he cannot resolve the conflicts he has permitted to develop within himself, then he will continue to be conflicted--self-critical, critical of society--feeling guilty, inferior, and, often, alienated, and he may well become seriously neurotic. But if he is fortunate, he can move beyond this level to that of the creative man, the individual whom we recognize as the productive artist and whom Rank described as the man of will. The man of will, indeed the artist, has effected integration of conflicting trends in himself. Through integration or through growth toward integration, the artist comes finally to a creative expression of his own individuality.

When we awaken students to possibilities of dealing with reality in opposite ways, we may make them in some way more conflicted. I wouldn't describe the introduction of conflict as pathological or as putting the individual in a bind. It is important to develop these opposing forces, for a certain psychic turbulence is necessary to the processes of synthesis, resolution, and evolving potential for further development. Through education we should nurture some kind of richness of complexity in the individual. Such education allows the possibility of differentiation and unique development which the adaptive individual would not show at all.

I would not be inclined to impute illness to Rank's second type, as he implies in his term "neurotic," although neurotic forces may be more fully developed in these people. I prefer to think of this conflicted condition as carrying in itself the possibilities of further development. Some individuals will develop beyond the conflicted condition, and others won't. Therefore, it seems to me there is no easy road to rich creative development and expression. It is unrealistic to desire or to seek instant creativity, in the way we want everything else by the instant. But, some would have us believe that there is a short course to creativity.

GLEASON: Earlier we talked about this more obvious conflict between encouraging students to be free, creative people and also asking them to be well-behaved citizens. What is a well-behaved citizen? For some people this means doing nothing, taking no stands; what creative person believes in that kind of good behavior?

This brings me to another question: Can there be any creativity without prior destruction, that is, destruction of old values, old systems, old ways of looking at things?

GIANNINI: To create something, it is not necessary to destroy. I believe we usually move ahead and build on what has gone before, on what has been learned. Why should we destroy that which may be the basis of creative development or new directions?

GLEASON: To clear the old out of the way, so it won't interfere or blind a person to new ideas and approaches--to destroy, in that sense, outmoded ways of thinking.

I have in mind a high school principal whom I witnessed in an exchange with a student I later came to know. This boy was one of the most interesting and potentially creative 16-year-olds that I have encountered. He aroused all the animosity possible from the principal because he wore blue jeans and sandals, he had an earring in one ear, and he wore a long Beatle haircut. The principal told this boy that he could not go, of all places, to the Bob Dylan concert, unless he removed the earring, because people would think he was a queer. There are a couple of points here: First, why should a man think that if a student decorates his ear with an earring he is necessarily a homosexual? Granted, this behavior is somewhat unusual, but this happened in a school with a strong program of encouraging children in creative activities and in becoming individuals. Second, the whole idea of placing such importance on the visual impact of someone's mode of dress, whether this be sandals or jewelry, instead of attempting to comprehend what is really going on, seems to me to be a very real hazard.

All this seems to relate back to the question of what is well-behaved. A well-behaved populace from the standpoint of most policemen is a population that gets off the street at 6:00 p.m. Regulations and restrictions are a means of eliminating potential problems. But what we really want are creative people, thinking, innovative persons who bring up problems; and such persons are not willing to hold still for whatever it is that went on before their time. This does not necessarily mean that we have to destroy Italian operas in order to write other operas. However, creative youth should not be bound and restricted by traditions or the tried and tested. The creative musicians in jazz have made numerous breakthroughs into a new form or style by ignoring much that was accepted before.

MacKINNON: I pointed out earlier that sometimes people seem to feel they are being creative if they merely display the trappings of creativity, that is, if they dress or behave in unusual or original ways. Further, investigations of highly creative adult individuals in our research institute disclose that some are very conforming in many areas. Most individuals studied were rather conforming with respect to dress, perhaps because it was not worth their time to do something unusual in this regard. Their nonconformity was expressed in their intrinsic interest and performance in their art, their craft, or whatever. I'll have to admit that we frequently were amused at the institute at the highly creative individuals who came to us dressed more like businessmen than like some artists. Apparently we had some stereotypes along these lines, but we came to realize that, very often, extraordinary creative behavior is found in individuals who behave very conventionally.

GIANNINI: I don't know to what extent we can generalize about this. Some youngsters think that if they act creatively they then can create. In teaching in the arts, we have to learn to distinguish the real from the bogus. And you will find in music, too, any number of highly creative people who look like most other human beings on this earth.

GLEASON: I feel a need to vindicate myself for using the word "destruction." It probably was a bit too strong for what I had in mind. The process we have been discussing involves the development of new values and new approaches. But I would say that rather than destroying old values, one at least must question and reexamine them, which may lead to changes and the replacement of old values. I think that this is the course of development in jazz--finding or preferring the new way of expression over something that was accepted 10 years ago. The new is accepted at the expense of the old. I don't think all forms of expression can survive; therefore, when I used the word destruction, I meant that there is only room for so many expressive forms and esthetic expressions at a time. Isn't this true of life also? It seems that death and destruction are part of the life process.

GIANNINI: I understand destruction in that sense, but I don't call it destruction. The fact that we have to question, not only in being creative but in everything we do, is basic to living. We have to question all the time; if we don't question, we die. We may not die physically, but we die as thinking human beings.

An artist not only must question what is happening and what has happened, but he constantly must question what he is doing. He can't take for granted that what he is doing is right or best for him. He continually must question. In a way, the creative process is an unanswered question from the beginning to the end. If you were using destruction in that sense, I'll agree it is necessary. But I wouldn't call that destruction; I would call that building.

MacKINNON: I think you and Mr. Gleason are describing something similar to what I have noted in some of the creative people we studied. They seem to have the extraordinary capacity to be dissatisfied with what they have done without becoming discouraged. They never are wholly satisfied with their last creative products, and they strive for even more difficult tasks the next time, and move on toward greater challenge. This is wonderful. Not everybody has the ability to be continuously self-critical and basically self-accepting, while having a certain sense of destiny, commitment, and involvement in what he's doing. This ability permits one to look back with dissatisfaction while going on courageously to even more difficult undertakings.

GIANNINI: That's a very interesting point. As a composer, for instance, if I wanted to write a composition greater than every other, I would spend a whole lifetime and never finish it. Always, I would find something wrong with it. In fact, I am never completely satisfied with my compositions. But one can only do the best he can and say, Today I have finished as far as I can see; this is fine. Maybe two months later I am unhappy, so I go ahead with the next work.

A composer is nervous and often hesitant when he starts a work, but at the same time he wants to get to the last double bar to finish it. He keeps thinking and writing, keeps on trying to get more and more of himself into it. While he works he learns. He keeps thinking about what he is saying and what he wants to say, and he frequently worries about communicating. Besides, he's never sure how well he's doing.

TRENT: Several of your remarks bring me to another question. You have been talking about tension and anxieties, about living with ambiguities, about striving for, while never quite accepting, success. You seem to imply that the creative person is living with frustration much of the time. Is it possible that there is a physiological dimension to creativity? Is it possible that some bright people who might be open to unique and new ideas can't stand the stress or strain and the ambiguity? Is it possible that many people are not productive because they can't live with the essential degree of turbulence and dissatisfaction?

GIANNINI: Well, people certainly vary in this respect. Some can live with tension, and some can't. And you can't help those who can't live with the uncertainty; you can't make them over. I don't think it's frustration we have been talking about. It is concern and uncertainty. A composer is never sure how his composition will turn out, and every time a performer goes on the stage he gets butterflies in his stomach. This is not frustration, and it is not a case of being scared. A person wants to do well and maybe he's anxious, but it's a nice anxiousness.

MacKINNON: That is very interesting. He calls it a nice anxiousness. This is one of our striking findings with the most creative individuals. They score higher on measurements of anxiety than the less creative individuals. In other words, they display and probably live with more anxiety than the less creative. But they are not incapacitated by it, probably because the highly creative also score high on psychiatric scales assessing ego strength, control, and adaptability. The relation between psychopathology and creative behavior is not simple. But, to oversimplify it, the highly creative individuals are at once more disturbed, more discontented, and more anxious, and healthier than the average man.

GLEASON: In line with what's been said, it is generally known that performers are highly nervous before they go on stage to perform, even veterans of many years' experience. Joan Baez, only within the last six months, was able to whip a nervous reaction that had dogged her throughout her concert career. Most people would never surmise the tension under which she worked. She has learned to deal with this by isolating herself for 15 minutes before a performance, in total silence.

Another example is Gillespie, who has performed night after night under the most outrageous conditions and who has had a great variety of experiences on stage; yet he is still nervous before he steps on stage. Jazz musicians don't know how a performance is going to go, and they want things to go well; they want to do well. As a matter of fact, communication is the essence of the performance. Almost all artists who are worth anything at all, certainly the performing artists, want to communicate to their audience. They want the audience to hear them, to love them,and appreciate them; otherwise most performers wouldn't be there.

GIANNINI: Paderewski's manager told me that even after this famous pianist had been before the public for years and years, he never overcame his preconcert nervousness. Before every performance, they had to go to his hotel at about 5 o'clock, and they would find him crying in despair, saying he didn't want to perform that night. They had to talk to him slowly, to bring him around with whatever argument worked, and so it went before every concert. Only after the first few minutes on stage was he all right.

GLEASON: In this regard, is it true in your experience, that for the really great performing artists the only reality, in truth, is when they are on stage performing, and all the rest is intermission? I have heard this from jazz musicians. Bob Dylan said, in a press conference in San Francisco, "All I do is to make up songs and perform; everything else is an interference." From observing some individual performers whom I know, this seems to me to be particularly true. The reality for them is on stage, to the degree that if there are just five people in the audience, they see 5,000 because they become alive as performers on stage.

GIANNINI: Well, I believe this"true reality" on stage exists for many artists. The audience is absolutely necessary for a performer, otherwise he cannot perform at his best. For a composer it is a little bit different. But as a performer, I didn't feel like playing when the audiences were small. I would have preferred practicing at home.

GLEASON: I have heard that the stamp of the great professional performing artist is that he has established a certain performance level he never goes below. However, he rises above this level when he feels a sympathetic response from the audience.

TRENT: Someone in our audience, at the break, suggested that following schedules suppresses creativity. She was speaking of school, with all its organization and living by the clock. Now, I hate to be party to a schedule, but I've been given one. Before calling a halt to the session, may I ask you about one other matter, which has been mentioned frequently throughout this conference? What kinds of programs might schools initiate to foster and encourage creativity? Much has been written about the kind of elementary education programs which promote creative experiences for all children. The conference on creativity at the collegiate level reveals little research has been done on educating for creativity at this level, except in the creative arts, and some of the speakers thought this was unfortunate. Are there any new developments? For example, we have read about a form of "free university," an experimental college run by the students at San Francisco State College. The curriculum is largely determined and organized by the students. The program is presently successful in that the administration is supporting this to the point of granting credits for some of the work. What are your reactions? Would you comment on developments such as this?

GIANNINI: I think this sort of thing is important, for I believe that the students do not exist for the school; the school exists for the students. It isn't the buildings that make the school; the buildings merely are places to sit and work. The faculty provides experiences and ideas and new directions. But the chief purpose of the total system lies in the youngster to be taught. The students make the school. Perhaps these free universities can restore the emphasis of college education to the students.

GLEASON: All I know about the free universities--and there are three such projects in the Bay Area--is that they seem to provide learning experiences outside of existing programs. "Ask and you shall receive" ought to be the philosophy of these free universities. I think that, to the extent that students remain instrumental in creating these new situations, something important may develop and with good effect on the total university. What is developing at San Francisco State College seems to have a lot of merit.

MacKINNON: I think the program, as such, is not very important. Here at Berkeley, we have the Tussman plan with a particular course content. But the Tussman plan, I believe, could have been quite different in content and operation and still represent a valuable experience. I would not place so much emphasis upon the particular content presented in a new program. Rather, I would stress the importance of the kind of interaction that occurs between the people in the program--the students and the instructors. I think the type and quality of the learning experience, whatever the program content, is the most important consideration.

TRENT: The panel members have left us with a number of questions to consider. Clearly, we have much to learn about the nature of the many forms of creativity. First, we need to know whether creativity is an innate trait or one that can be developed. Assuming that it is possible to foster creative endeavor, we have yet to learn what particular conditions help to foster the various forms of creativity. Then, I believe, we must accept the challenge to find effective means of encouraging creative expression in our schools and colleges.

PAUL HEIST

Selected Bibliography

This bibliography represents a selection of the available writing and research reports on the topic of creativity, its nature and nurture. The selections were limited, with a few exceptions, to the period following 1950, with major attention directed to the years from 1958 to 1965.

The abstracted or summarized publications were selected in part because of their actual or possible relevance to education for creativity in college and also as chief examples of the variety of recent pertinent literature. The abstracted publications review what is known about creative young people and the problems of educating them.

ANNOTATED OR SUMMARIZED REFERENCES

Some brief abstracts following were taken from Psychological Abstracts (indicated by *) and from Creativity and the Individual (indicated by +) by Stein and Heinze.

Barron, F. Creativity and psychological health: origins of personal vitality and creative freedom. Princeton, New Jersey: D. Van Nostrand, 1963.

This book summarizes 10 years of research on recognizing and fostering creativity in ourselves and others. The research, involving more than 5,000 men and women, is concerned with personal change and growth through psychotherapy, with

religious beliefs and philosophies of life as bases for action, the paradox of freedom and necessity, transcendental experience, and personal creativeness. The book also discusses the relationship between artistic creation and religious belief and self-renewal and conflict in creative change. The book analyzes the relation between psychological health and the ability to be free, original, and expressive. The author superimposes realistic individuals on statistical profiles, discusses the philosophical questions of sanity and society, and evolves to some extent an idea (rather than a description) of a creative, healthy individual.

Burkhart, R. C. Spontaneous and deliberate ways of learning. Scranton, Pennsylvania: International Textbook, 1962.

This book is a sophisticated teachers' manual. The work is based on research of the author and other research-oriented teachers, and it follows the work of V. Lowenfeld. The main focus is on the pupil's creative growth as an individual as seen in his work and progress in art. The author distinguishes between spontaneous and deliberate creators, their personalities, relationships to productive teachers, experiences during the creative process, and the influence of instructions on these two kinds of students. Personality analyses are made on the bases of student reports, judgments of the students' art, observation of their methods, and psychological tests.

De Mille, R. The creativity boom. Teachers Coll. Rec., 1963, 65, 199-209.*

Three discernible components of creative productivity--temperament, motivation, and intellect--are discussed. Intellectual abilities tend to be associated with creativity, although they are not highly correlated at all levels. The author also discusses the development of creativity in the classroom.

Dentler, R. A., & Mackler, B. Originality: some social and personal determinants. Behav. Sci., 1964, 9, 1-7.

This study defines originality as the degree to which uncommon responses are given to a task. The subjects were university undergraduates with high academic achievement. Sex and individual level of anxiety were controlled. The study aimed to identify some social conditions under which the production of novel, statistically uncommon, or infrequent responses to a problem increased. Social and interpersonal situations can affect the quantity and quality of novel responses. The study also explores the association between originality and certain individual personality characteristics viewed as affecting interpersonal behavior. Anxiety acts as a depressant; the more anxious were less original.

Drews, Elizabeth M. The development of talent. Teachers Coll. Rec., 1963, 65, 210-19.*

There appear to be marked similarities between the cultivation of creativity and the process by which psychologists say that mental health is achieved. The article examines two of the most important environmental conditions, freedom and an unconditional psychological acceptance.

Feibleman, J. K. The genius versus the American university. J. high. Educ., 1960, 31, 139-42.

This author believes that "U.S. educators have made a mistake in imitating the model of American business. Universities should have an atmosphere of contemplation, not hustle and bustle. . . The genius is not produced but induced. . . If we are to have our share of geniuses, we must learn how to leave people alone. Perhaps we should not place so much emphasis on degree requirement. . ."

Flescher, I. Anxiety and achievement of intellectually gifted and creatively gifted children. J. Psychol., 1963, 56, 251-68.

The author states as the purpose of his study: "Explanations regarding complex cognitive functioning inevitably lead to the search for intervening variables. The Getzels and Jackson study revealed that achievement motivation was not a distinguishing factor. In seeking clarification of the intelligence-creativity-achievement relationship, the present investigation was designed to determine to what extent the personality variable of anxiety is a mediating influence.

"The results showed the significant role of intelligence in academic performance. Creativity was not determined to be related to academic success. The extent of general and test anxiety were also assessed and found to be unrelated to intellectual ability or productive thinking."

Getzels, J. W., & Jackson, P. W. Creativity and intelligence: explorations with gifted students. New York: John Wiley, 1962.

This book reports intensive research on a selected sample of students, using specific instruments designed to provide relevant data. "The primary purpose of the study was to explore certain neglected issues regarding gifted cognitive and psychosocial functioning. The criterion at each point in our exploration was not whether this step would provide an unalterable datum but if it would lead to an observation that is heuristic."

"Our work with children is itself an extension and partial replication of work with adults done by F. Barron, J. P. Guilford, D. W. MacKinnon, M. I. Stein, and others."

The authors worked with high school students of high intelligence (average IQ, 132) in a special school. They focused on creative potential among their subjects, as well as intelligence measures. They tried to outline such things as personality characteristics, family background, etc. The report discusses the educational implications of the findings, and suggests revisions to accomodate the highly creative as well as the highly intelligent. It also includes descriptions and examples of the measures used.

Golann, S. E. Psychological study of creativity. *Psychol. Bull.*, 1963, 60, 548-65.

This review of the literature covers much the same material M. Stein and S. Heinze reviewed a year earlier. Golann discusses four areas of emphasis, one of which usually appears in all studies of creativity. These include the use of products as criteria for creativity, the creative process itself, the devising or adapting of tests as measures of creativity (and the relationship of intelligence to creativity), and personality. Golann subdivides the latter area into studies of the motivation of creative behavior and personality characteristics or life styles of creative individuals.

Gruber, H., Terrell, G., & Wertheimer, M. (Eds.) *Contemporary approaches to creative thinking: a symposium held at the University of Colorado.* New York: Atherton Press, 1963.

This book contains articles by J. Bruner, M. Henle, A. Newell, R. S. Crutchfield, R. McClelland, and R. B. McCloud. Each appraoches somewhat differently the problem of defining and discussing the nature of creativity. The approaches include analogies to computers, statistical analyses, intuitive reports of creativity, and others. Contributors attempt to define creativity and identify the personality correlates of creativity.

Holland, J. L. Creative and academic performance among talented adolescents. *J. educ. Psychol.*, 1961, 52, 136-47.*

The relationships among criteria of academic and creative performance and 72 personal, demographic, and parental variables were studied in a sampling of talented adolescents. The results did show that creative performance at the high school level occurs more frequently among students who are independent, intellectual, expressive, asocial, consciously original, and who have high aspirations for future achievement. Students who are persevering, sociable, responsible, and whose parents hold somewhat authoritarian attitudes and values are more frequently academic achievers.

Levy, N. J. Notes on the creative process and the creative person. _Psychiat. Quart._, 1961, 35, 66-77.*

This article reviews 21 references on creativity. The creative potential exists in varying degrees in everyone. Psychological studies reveal that creative people often seek and live with tension and conflict and are more in contact with the unconscious than are other people. The creative potential is directly related to the periods of psychic freedom a person experiences. Inner conflicts may lead to emotional constriction, fears, compulsive behavior, and other neurotic solutions. Each individual responds to the creative urge in his own way.

Lowenfeld, V. _Creative and mental growth._ New York: Macmillan, 1957.

This book is written for art teachers who want to understand the mental and emotional development of children. The author attempts to show how the child's general growth is related to his creative development and vice versa. The child's creative expression during specific stages in his mental and emotional growth can be understood and appreciated only if the general causal interdependence between creation and growth is understood. The author also attempts to show methods of approaches to art education based upon psychological relations between creation and creator at the different age levels. Students' progress should be considered on an individual basis, with consideration of the students' developmental stages, rather than on a rigid, planned, generalized class basis.

Lowry, W. M. The university and the creative arts. *Educ. Thtre J.*, 1962, 14, 99-112.

The author points out that universities have almost put out of business music conservatories and fine arts colleges, yet do not provide adequate training for talented students.

MacKinnon, D. W. Fostering creativity in students of engineering. *J. Engng Educ.*, 1961, 52, 129-42.

In this article, the author discusses how to foster creativity in students. Although his work has been with mature creative people, the characteristics of these people are seen in students with creative potential. Creativity, he suggests, is a process which involves originality, adaptiveness, and realization. The creative person is less interested in small details and more concerned with meanings and implications. He also is more flexible cognitively, and is characterized by verbal skills and interests as well as accuracy in communication with others. He values the theoretical and the esthetic, is intuitive-perception oriented rather than sense-perception oriented, and is inclined toward introversion. In school, he is not necessarily an honor student, sometimes as a result of rebelliousness or lack of interest. He is more in touch with his unconscious psychic processes.

As creativity is not necessarily correlated with intelligence, selecting and rewarding students on the basis of grades may rule out highly creative people. In teaching creative students, MacKinnon suggests "not that we slight acute and accurate sense perception, but that we use that to build upon, leading the student always toward an intuitive understanding of what he experiences." He also suggests giving creative students maximum freedom in attaining their academic objectives and advises setting the goals high enough to challenge the student and involve him in overcoming obstacles. The author stresses the importance of the college community which, if stimulating, can contribute to nourishing creativity. Finally, he warns the teachers he is addressing that they may not always like their creative students because of the students' attitudes toward themselves and the world around them.

MacKinnon, D. W., The nature and nurture of creative talent. Amer. Psychol., 1962, 17, 484-95.

MacKinnon emphasizes his work with architects in this article. He discusses personality characteristics of the creative person. This person generally has a good opinion of himself, has a good intellect, shows a complexity and richness of personality, a general lack of defensiveness, and a candor in self-description. In other words, he shows an openness to experience both outside and inside himself. He has a wide range of interests (including those which are considered feminine), is more often introverted, shows a preference for feeling and perception rather than thought and judgment. He often has a lack of intense closeness with one or both parents. Many of the creative people in MacKinnon's study had autonomous mothers, and their families moved frequently. Discipline was consistent and predictable. The author cautions parents and teachers in setting limits for creative people, yet points out that some discipline and self-control are necessary. He also gives suggestions on how to train creative people to be intuitive.

McClelland, D. C., Baldwin, A. L., Bronfenbrenner, U., & Strodtbeck, F. L. Talent and society. Princeton, New Jersey: D. Van Nostrand, 1958.

Two chapters give a general treatment of the whole field of creativity. The remaining chapters are reports of completed research projects. The studies are searches for noncognitive factors that will facilitate the identification and development of talent. MacClelland sees a need for research on: (1) the stability of traits over time, (2) the functional characteristics of various performance situations, and (3) the stability of relationships between characteristics over time. He discusses the criteria of talent. Criteria will vary with the social and cultural milieu in which they are judged. Another determinant is subculture membership and values associated with it.

Baldwin considers ability as "a characteristic of the person which permits him to behave adaptively" and discusses it as such. The authors' recommendations for further study include: (1) continued study of the expressive characteristics of the person--values, motives, etc., (2) study of the social situation in which performance occurs, and (3) study of ways of modifing stable characteristics of persons and situations. Their research shows that offering scholarships is not enough to encourage talent. Research should be strengthened in talent identification and development.

McDaniel, E. D. (Ed.) Creativity and college teaching. (conference proceedings) Bull. Bur. Schl Serv., June 1963, 35, 4, College of Education, University of Kentucky, Lexington.

This volume contains contributions from D. W. MacKinnon, D. W. Taylor, R. L. Mooney, H. A. Thelen, M. J. M. Aschner, and R. W. Tyler. The introduction to the collection states: "MacKinnon's report of his investigation of the backgrounds of creative people suggests that creative individuals exhibit personality traits which distinguish them from people in general. MacKinnon goes on to examine some of the implications of his findings for nurturing the creative potential of students. . . Taylor approaches the problem of creativity through analysis of the thinking process. A productive approach to understanding this process, he feels, is that of utilizing computers to simulate human thinking. . . The teacher might well concentrate on identifying and teaching the heuristics most applicable to his discipline. . . Mooney, in his presentation, sees the act of creating as analogous to the biological phenomena of life. He suggests that the creative person, like all living systems, is selectively taking in elements from the environment, integrating them, and testing the evolving internal system for fit with the environment. Mooney would ask of teachers and educational systems that they establish conditions which facilitate this process. . .

"Thelen sees creativity as emerging from the process of inquiry. He constructs a conceptual model of the imperatives generated in the sequence of inquiry in the classroom. Students move from problem confrontation toward solutions, from formlessness toward structure, from preconscious toward conscious ideas, from private hunches toward public statements of position. These transitions are viewed as steps in the process of creating, and teaching becomes a matter of maximizing these qualities of experience. . . Aschner's report of work in progress is an illustration of the empirical studies which ultimately must be made to test hypotheses relative to the development of creative thinking. . . Tyler directs attention to the ways in which teachers may evaluate their efforts to develop creativity in students. . . As a group these papers point to problem areas which are in need of further investigation: The background and personality of the student, the dynamics of the instructional group, and the strategy and tactics of the teacher."

McElvain, J. L., Fretwell, L. N., & Lewis, R. B. Relationship between creativity and teacher variability. Psychol. Rep., 1963, 13, 186.

The authors drew several conclusions from creativity test scores of 209 teachers. Differences were unrelated to sex, education, experience, and teaching level and were negatively correlated with age. "Results suggest that for the selected adult population, creativity may be a fairly stable trait, since all variables but age were nonsignificant and correlated so closely to 0. The evidence reported here, that school administrators tend to give lower ratings to the highly creative teacher, gives direction to other topics for research. There may be inherent within creativity, as it is measured, personality characteristics that are not valued in teachers."

McKellar, P. Imagination and thinking: a psychological analysis. New York: Basic Books, 1957.+

The author analyzes the psychological bases of thinking, imagination, originality, creativity. He distinguishes between thought products which are reality adjusted and those which are artistic. Originality consists in connection, rearrangement, and fusion of perceptions in a new way. Any human thought can be analyzed from the aspect of motivation and content. The book deals primarily with content and relies heavily on the associationist tradition. The author asserts that the type of imagery and imagination experiences of creative individuals might go far in explaining their works.

Conditions for creativity include a suitable and worthwhile field for its exercise. The most profitable fields are those in which criticism leads to the refinement and extension of ideas; a critical attitude also is favorable to creativity. A period of incubation, involving inactivity or a change of activity is also condusive to creativity. Overlearning may lead to either creativity or mental rigidity. The latter is found in those people who become dependent on either primary or secondary perceptions. Creativity requires interaction of the primary and secondary perceptions. Understanding, which enables one to criticize and reformulate in alternate ways, would serve as a criterion of learning that is favorable to creativity. Works of art as thought products are dealt with extensively. Scientific reasoning is also analyzed and contrasted to art. Art is both artistic and reality-adjusted thinking. Scientific reasoning consists primarily of the latter.

Schaefer-Simmern, H. *The unfolding of artistic activity: its basis, processes, and implications.* Berkeley and Los Angeles: University of California Press, 1948.

This book presents the results of an experiment undertaken". . . for the purpose of showing by actual case histories the development of the creative potentialities in men and women in business and the professions, and in institutionalized delinquents and mental defectives--that is, persons not devoted to the arts. New directions in art education are essential to meet the need for creative experience, and they must be based on the natural unfolding and development of artistic abilities. Art teaching now is too systematic and detailed. Yet this contradicts the nature of man and of creativity which should grow out of the artist as a total process. The goal of art education is 'the natural cultivation of growing mental powers as they operate scientifically and interfunctionally within the process of artistic 'configuration.'"

The author sees as one of the main obstacles to development of creativity the common attitude that gives credit only to talent. He believes that the cultural decline which he sees in America and Europe can be stopped only if everyone learns to develop his own creativity. Creativity should be developed through organically conceived educational processes.

Simons, J. H. Scientific research in the university. *Amer. Sci.*, 1960, 48, 80-90.*

The author suggests that teaching creative scholarship and training creative scholars could be accomplished by exposing the student to the stimulation and example of a mature scholar of demonstrated creative ability through intimate contact.

Stein, M. *Survey of the psychological literature in the area of creativity with a view toward needed research.* New York: Research Center for Human Relations, New York University, 1962.

The research which Stein sees as necessary includes setting up ultimate criteria of creativity, with factors spelled out so comparative research can be done. Also, researchers should come to agreement about systematic sets of personality characteristics and sets of variables in the structural aspects of the field of creative endeavor. Another subject needing investigation is the types of individuals who are and are not creative, perhaps to establish constellations of personality characteristics. Finally, he sees a need for predictive studies.

In general, the author asks for coordinated and cooperative research efforts among problem-oriented researchers. He suggests that a group of investigators be established from several fields to select groups of individuals for study in a variety of areas. They would use a core battery of tests on subjects, plus more specialized tests from each investigator. They would pool results. Coordination is needed between lab studies of subjects chosen from psychometric data and studies of individuals proven to be creative by their production. The author advocates using a wider range of theories and speculations on creativity, for example, psychoanalytic, rather than only the empirical methods which are emphasized to date.

Street, W. P. (Ed.) Creativity in its classroom context. (conference proceedings) Bull. Bur. Schl Serv., 1964, 36, 4, Lexington: College of Education, University of Kentucky.

This book includes presentations by the following: N. Sanford, K. Keniston, H. A. Thelen, J. W. McKeachie, and P. Dressel. The papers were delivered at a conference held at Carnaham Hill, University of Kentucky, in 1964.

The introduction states: "Sanford's analysis of American college youth emphasizes the adjustment each student must make when he finds himself catapulted into a totally new environment. . . The student substitutes a new social order--the student culture--for the previous moral authority. The power of this social milieu in changing the student is perhaps one of the major forces operating in the student during the college experience. Sanford would encourage faculty to be more cognizant of this subtle but substantial force. . . Keniston. . . discusses values and perceptions which depart in significant ways from the values underlying the adult culture of the faculty members. . .

"Thelen speaks out against the use of the class primarily as an instrument of 'socialization rather than education.' He follows with a discussion of classroom activity organized around the results of research in group dynamics. Central to his argument is the interpersonal support for the intellectual venture provided by classroom groups. Two types of groups operating in the classroom are discussed: the psyche group, based on voluntary associations mainly for the purpose of ego satisfaction, and the socio group, formed to accomplish work. The relation of these groups to teaching. . . is the major theme of Thelen's contribution. . . McKeachie, in a comprehensive review of research on teaching, provides excellent coverage on the range of techniques usually encountered in the classroom. While the research is often inconclusive and contradictory, he concludes that the effective teacher tends to be a listener rather than a talker, a questioner rather than an answerer, a moderator rather than a dictator, a clarifier rather than an evaluator, and a stimulator rather than a performer. . . Dressel, after reviewing what he sees as the six major functions of instruction, notes two points at which teaching may be evaluated: the process of instruction itself and the results of the instruction. Dressel identifies testing as a critical component in determining the kind of learning behavior in which students are actually engaged."

Taylor, C. W., & Barron, F. (Eds.) Scientific creativity: its recognition and development. New York: John Wiley, 1963.

The book includes selected papers from the proceedings of the first, second, and third University of Utah Conferences on the Identification of Creative Scientific Talent. The papers are arranged according to criteria; intellectual, personality, and motivational characteristics; environmental conditions and specific situational determinants; and theoretical analyses of process. Includes a 400-item bibliography.

Thorndike, R. L. The measurement of creativity. Teachers Coll. Rec., 1963, 64, 422-24.

The author's discussion takes off from 1962 publications by Getzels and Jackson, IPAR, and Torrance, plus the 1954 article by Wilson, Guilford, et al. All agree on the low correlation between creativity and what is measured by IQ and scholastic aptitude tests. On creativity tests, the examinee must produce answers, not select one. He usually must produce multiple responses. The overlap between subtypes of creativity is less than that between cognitive subabilities. This fact has received little attention from those who have used creativity tests. The major suggestion of the article is that researchers give each so-called creativity test a more specific name.

Torrance, E. P. Must creative development be left to chance? Gift. Child Quart., 1962, 6, 41-44.*

Certain teaching techniques increase original thinking. Evidence adduced from investigation in Samoa links the decline in creativity to the low value placed on adventurousness and curiosity and the high value placed on promptness and competitiveness. Associated with cultural "discontinuities," however, is a rise in creativity.

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Appendices

APPENDIX A

AVL STUDY OF VALUES
BRIEF SCALE DESCRIPTIONS

Theoretical: The dominant interest of the theoretical man is the discovery of truth. In the pursuit of this goal he characteristically takes a "cognitive" attitude, one that looks for identities and differences; one that divests itself of judgments regarding the beauty or utility of objects, and seeks only to observe and to reason.

Economic: The economic man is characteristically interested in what is useful and practical. Based originally upon the satisfaction of bodily needs (self-preservation), the interest in utilities develops to embrace the practical affairs of the business world--the production, marketing, and consumption of goods, the elaboration of credit, and the accumulation of tangible wealth.

Aesthetic: The aesthetic man sees his highest value in form and harmony. Each single experience is judged from the standpoint of grace, symmetry, or fitness. He regards life as a procession of events; each single impression is enjoyed for its own sake. He need not be a creative artist, nor need he be effete; he is aesthetic if he but finds his chief interest in the artistic episodes of life.

Social: The highest value for this type of person is love of people. In the Study of Values it is the altruistic or philanthropic aspect of love that is measured. The social man prizes other persons as ends, and is therefore himself kind, sympathetic, and unselfish.

Political: The political man is interested primarily in power. His activities are not necessarily within the narrow field of politics; but whatever his vocation, he seeks to be influential and in control.

Religious: The highest value of the religious man may be called unity. He is mystical, and seeks to comprehend the cosmos as a whole, to relate himself to its embracing totality. The religious man may be described as one whose mental structure is permanently directed to the creation of the highest and absolutely satisfying value experience.

Excerpted from: Allport, G. W., Vernon, P. E., & Lindzey, G. Study of values. A scale for measuring the dominant interests in personality. Boston: Houghton-Mifflin, 1951.

APPENDIX B

OMNIBUS PERSONALITY INVENTORY (FORM D)
BRIEF SCALE DESCRIPTIONS

Thinking Introversion (TI): Persons scoring high on this measure exhibit a liking for reflective thought, particularly of an abstract nature. They express interests in areas such as literature, philosophy, and history. Their thinking tends to be less dominated by objective conditions and generally accepted ideas than that of low scorers. The latter--extroverts--tend to evaluate ideas on the basis of their immediate practical application.

Theoretical Orientation (TO): This scale assesses the degree of interest in using scientific methods in thinking, including interest in science as such and in scientific activities. High scorers are generally more logical, rational, and critical in their approach to problems than those scoring at the average or below.

Estheticism (Es): High scorers endorse statements indicating diverse interests in artistic matters and activities. The content of the statements extends beyond painting, sculpture, and music and includes interests in literature and dramatics.

Complexity (Co): This measure reflects an experimental orientation rather than a fixed way of viewing and organizing phenomena. High scorers are tolerant of ambiguities and uncertainties, are fond of novel situations and ideas, and are frequently aware of subtle variations in the environment. Most persons with very high scores on this dimension prefer to deal with complexity, as opposed to simplicity, and seem disposed to seek out and enjoy diversity and ambiguity.

Autonomy (Au): The characteristic measured is composed of nonauthoritarian thinking and a need for independence. High scorers are sufficiently independent of authority, as traditionally imposed through social institutions, that they oppose infringements on the rights of individuals. They tend to be nonjudgmental and realistic.

Religious Liberalism (RL): The high scorers are skeptical of religious beliefs and practices and tend to reject most of them, especially those that are orthodox or fundamentalistic. Persons scoring around the mean and lower are indicating various degrees of belief in general and their subscription to specific tenets and dogma.

Impulse Expression (IE): This scale assesses the degree to which one is generally ready to express impulses and to seek gratification either in conscious thought or overt action. The high scorers value sensations, have an active imagination, and their thinking often is dominated by feelings and fantasies.

Schizoid Functioning (SF): High scorers (above 70) exhibit some attitudes and behavior that characterize socially alienated persons. Along with frequent feelings of isolation, loneliness, and rejection, they may intentionally avoid most others and experience feelings of hostility and aggression.

Social Introversion (SI): High scorers withdraw from social contacts and responsibilities. They display little interest in people or in being with them. The social extroverts (low scorers), on the other hand, seek social contacts and gain satisfaction from them.

Lack of Anxiety (LA): Persons scoring high on this measure indicate that they have few feelings or symptoms of anxiety and do not admit to being unduly nervous or worried. Low scorers admit to a variety of these kinds of symptons and complaints.

Masculinity-Femininity (MF): This scale reflects some of the differences in attitudes and interests between college men and women. High scorers (masculine) deny interest in esthetic matters and admit to few feelings of anxiety and personal inadequacy. They also tend to be less socially oriented than low scorers and more interested in scientific matters.

Response Bias (RB): High scorers respond to a majority of the statements in this scale in a way which is typical of experimental subjects who are asked to make a good impression. The responses of low scorers are similar to those of subjects instructed to make a poor impression. Scores between 40 and 60 denote valid scores on other scales.

Excerpted from: Center for Study of Higher Education. *Omnibus personality inventory*. Berkeley: the Center, 1960.

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